Under-Pricing and Long-Run Performance of Initial Public Offerings in Developing Markets: the Case of Thailand

Kulabutr Komenkul

H00119552

Submitted for the degree of Doctor of Philosophy in Finance

September 2015

Heriot-Watt University

School of Management and Languages

Department of Accountancy, Economics and Finance

The copyright in this thesis is owned by the author. Any quotation from the thesis or use of information contained in it must acknowledge this thesis as the source of the quotation or information.

Abstract

The IPO underpricing phenomenon has existed for a long time in stock markets around the world, although its magnitude varies from country to country. However, the evidence regarding IPO over-performance or underperformance in the long-run is mixed. The purpose of this thesis is to examine the long-run performance of IPOs in Thailand using various methods to ascertain the significance of the over- or under-performance of IPOs. The Thai stock market is a relatively new stock exchange compared to established stock markets. Therefore, there are not yet many public companies listed on the Thai market. Consequently, one of the ambitions of the Stock Exchange of Thailand (SET) is to stimulate market activity and increase the number of Initial Public Offerings (IPOs) in Thailand. This may mean that a close study of a number of important issues related to the Thai IPO stock market is particularly interesting. The thesis, therefore, investigates three inter-related empirical issues concerning the Thai IPOs listed on the Stock Exchange of Thailand (SET) and the Market for Alternative Investment (MAI) during the period 2001 to 2012.

The first empirical study re-examined the evidence from the long-run returns. The three-year stock returns of the IPOs were investigated using Cumulative Abnormal Returns (CAR), Buy-and-Hold Abnormal Returns (BHAR), and Wealth Relatives (WR). This study further compared abnormal returns with various alternative benchmarks, such as the CAPM, the Fama and French (1993) Three-Factor (FF) models, the Size Control Portfolio (SD) model, the eight industry benchmarks, and also more robust statistical tests. The calendar-time approach based on the market model with an additional liquidity factor as well as Fama-French and Carhart models were applied for verifying long-run abnormal returns. This study provided robust evidence that Thai IPOs underperform in the long-run, irrespective of alternative benchmarks and methods. However, the results are sensitive not only to the methodology used, but also to the exact-time-period chosen and the size effect from big-sized companies going public in the sample period. If they omitted the two big firms from the IPO sample and considered the equally-weighted CAR and BHAR, the event-time returns related to CAPM, FF and SD models and the calendar-time approach, they would conclude that they cannot earn any abnormal returns irrespective of the alternative benchmarks and weighting methods used. In the same vein, after controlling for firm size, the long-term over-performance will disappear for Thai IPOs.

Abstract

The second empirical study examines the relationship between the intended uses of IPO proceeds disclosure and the under-pricing and long-run performance of IPOs. The results reveal that the levels of use-of-proceeds disclosures reduce firms' cost of capital. This study also suggests that firms disclosed use-of-proceeds for investment has negative effects on IPO underpricing. The findings also indicate that the proportion of common shares owned by the Thai government provides a positive signal for IPO over-performance in the long-run. For the effect of the use-of-proceeds purposes, this study suggests that 'Investment' IPOs perform better in the long-run than 'Debt Repayment' IPOs. The final empirical study investigated the relationship between IPOs' pricing effects and their subsequent classification as speculative investments. The findings showed a significant positive relationship between the magnitude of the IPO underpricing and the probability of an IPO firm being officially classified as speculative on the Turnover List (TOL). The results also revealed that a six-month abnormal return after going public increases the probability of speculative dealing in the IPOs.

There are several implications for this study. The findings may therefore be useful for investors, security analysts, and companies and regulators in many other emerging markets beyond Thailand. Given the conflicting results of poor post-IPO stock market performance, investors may do better holding Thai IPOs for a short period with the likelihood of gaining a higher return. In addition, the results help investors to identify which characteristics are associated with more over-performance or underperformance, which will be informative to them when formulating their investment strategies. For the IPO firms, endogenous information disclosure of intended use-of-proceeds could be used as another signaling factor, but it creates a trade-off between the benefit of reducing information asymmetry and the costs associated with revealing information and possible litigation. Additionally, the findings from the third empirical work in this thesis are particularly useful for SET and SEC, enabling the Thai authorities to monitor IPOs that have a high probability of becoming speculative stocks in the future and so be able to warn investors about the risks associated with trading in them. Regulators may also use the probability of Turnover List risk as one of the benchmarks to measure the success of the rules they impose on companies planning to go public.

Acknowledgements

I would like to express my special appreciation to all the individuals and organisations that have assisted and supported me in producing this PhD thesis, although it seems impossible to mention all of them by name. First of all, I would like to express my sincere thanks to Professor Janusz Brzeszczynski, who initially directed me to such an interesting research area even though he was finally unable to provide supervision for the whole period of my research as he moved to the Newcastle Business School at Northumbria University. I am especially indebted to Associate Professor Mohamed Sherif who then became my principal supervisor and provided excellent support and advice throughout my PhD studies. I am indebted to him for being so very patient while reading and revising the many drafts of my thesis, for helping to develop my research skills and for encouraging me to present my empirical works at several conferences. His constant encouragement and kind support enabled me to achieve a high quality of work and to fully enjoy and benefit from my research. My very special gratitude also goes to Dr Bing Xu who provided supervision starting in the third year of my PhD; she made very constructive comments on the '*Turnover List*' chapter. Associate Professor Mohamed Sherif and Dr Bing Xu have acted not only as my PhD supervisors but also as my mentors, giving many valuable comments on my research and findings and constantly urging me forward in my academic career. I would also like to express my further appreciation to the Heriot-Watt Support Team and in particular Caroline Murray and Juergen Munz for their great support.

I am also grateful to the participants of the CFI research seminar at Heriot-Watt University (in particular Associate Professor Boulis Ibrahim) in September 2012, the Chair and the Discussant at the 13th International Convention of the East Asian Economic Association (EAEA) in Singapore in October 2012 (Professor Akira Kohsaka and Associate Professor Michiru Sawada) and the participants of the 50th Annual Conference of the British Accounting & Finance Association (BAFA) at the London School of Economics (LSE) in April 2014 for their feedback on earlier versions of the '*Long-run Performance of Thai IPOs*' Chapter.

I would also like to thank the participants of the Scottish Doctoral Colloquium in Accounting and Finance at the University of Stirling (in particular, Professor William Rees from the University of Edinburgh) in June 2014 and the participants of the British Accounting & Finance Association (BAFA) Northern Area Group (NAG) Annual Conference at Northumbria University, Newcastle in September 2014 and the participants of the Young Finance Scholars Conference at the University of Sussex (in particular, Chairman Professor Ranko Jelic, in June 2015) for their feedback and helpful comments on earlier versions of the '*Turnover List*' Chapter. In particular, I would like to thank the anonymous referees at the BAFA conference for giving me The Best PhD Paper award 2014 for my third empirical chapter, on '*IPOs' Signalling Effects for Speculative Stock Detection*'.

I would also like to thank the Stock Exchange of Thailand (in particular, Assistant Professor Santi Kiranand, Executive Vice-President, Head of Markets Division and Issuer & Listing Division and Assistant Professor Dhanawat Siriwattanakul, CFP) for useful suggestions, and the Securities and Exchanges Commission (SEC) library, Thailand, for kindly providing data on the proportion of IPOs subscribed by foreign and institutional investors. I would like to thank the officials at the Information Technology Department of the Stock Exchange of Thailand (SET), in particular Thammanoon Kasemsuppakorn, for help in providing us with the industry index data. My appreciation also goes to the Department of Accountancy, Economics and Finance, the School of Management and Languages, Heriot-Watt University, for funding my conference presentations. I would like to take this opportunity to say thank you to the library at Heriot-Watt University for providing me with a wealth of information, enabling me to complete this thesis.

Finally, I would like to express my sincere gratitude to my parents and my brother for their great support and love, to my honorary 'Grandpa', Charles Goodall, who kindly helped me improve my English language skills, and to my best friends, Bulapat Attamana, Jiaqi Chen, Kanawat Asawachatroj, Kantitut Tubsuwan, Narongdech Thakerngkiat, Nongnuch Tantisantiwong, Phunpiti Bhovichitra, Thanee Glomjai, Wahida Yaakub, Woranop Sukparangsi, and others for accompanying and encouraging me always. With much love, I dedicate this work to you all.

ACADEMIC REGISTRY
Research Thesis Submission

Name*:*	KULABUTR KOMENKUL		
School/PGI:	SCHOOL OF MANAGEMENT AND LANGUAGES		
Version: *(i.e. First, Resubmission, Final)*	Final	Degree Sought (Award and Subject area)	DOCTOR OF PHILOSOPHY (FINANCE)

Declaration

In accordance with the appropriate regulations I hereby submit my thesis and I declare that:

1) the thesis embodies the results of my own work and has been composed by myself
2) where appropriate, I have made acknowledgement of the work of others and have made reference to work carried out in collaboration with other persons
3) the thesis is the correct version of the thesis for submission and is the same version as any electronic versions submitted*.
4) my thesis for the award referred to, deposited in the Heriot-Watt University Library, should be made available for loan or photocopying and be available via the Institutional Repository, subject to such conditions as the Librarian may require
5) I understand that as a student of the University I am required to abide by the Regulations of the University and to conform to its discipline.

* *Please note that it is the responsibility of the candidate to ensure that the correct version of the thesis is submitted.*

Signature of Candidate*:*		Date:	

Submission

Submitted By *(name in capitals):*	
Signature of Individual Submitting:	
Date Submitted:	

For Completion in the Student Service Centre (SSC)

Received in the SSC by *(name in capitals):*			
Method of Submission *(Handed in to SSC; posted through internal/external mail):*			
*E-thesis Submitted (**mandatory for final theses**)*			
Signature:		Date:	

Table of Contents

List of Tables

List of Tables

List of Tables

List of Figures

Abbreviations

AIM	Alternative Investment Market
BoT	Bank of Thailand
BHAR	Buy-and-Hold Abnormal Return
BSE	Bootstrapped Standard Error
BSREG	Bootstrapped linear regression
BSQREG	Bootstrapped quantile regression
H.	Hypothesis
CAPM	Capital Asset Pricing Model
CAR	Cumulative Abnormal Return
CGT	Capital Gain Tax
EW	Equally-Weighted
FE	Fixed Effects
FF	Fama and French Three-Factor Model
IPO	Initial Public Offering
LSE	London Stock Exchange
MAIR	Market-adjusted initial return
MAI	Market for Alternative Investment
OLS	Ordinary Least Squares
plc	Public Limited Company
RE	Random Effects
RSE	Robust Standard Error
SD	Size-Decile Control Portfolio
SE	Standard Error
SEA	Securities and Exchange Act
SEO	Seasonal Equity Offering
SEC	Securities and Exchanges Commission
SET	Stock Exchange of Thailand
Std.	Standard Deviation
TOL	Turnover List
VW	Value-Weighted
WR	Wealth Relative

CHAPTER 1

INTRODUCTION

Chapter 1

Introduction

1.1 Background to the Research Area

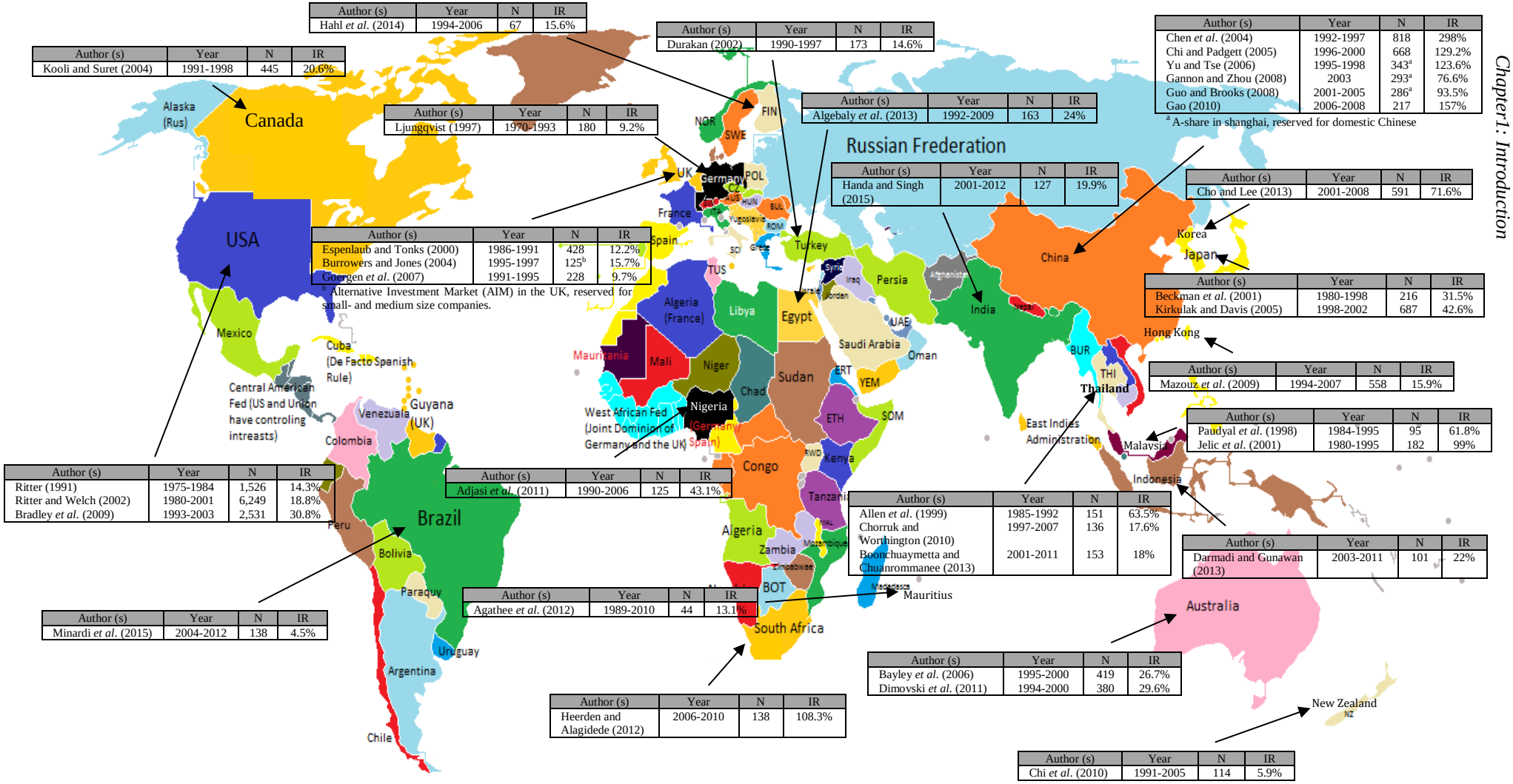
The ultimate goal for any firms is '*Going Public*' via an initial public offering of shares to investors. Going public marks an important watershed in the life of a young company (Ljungqvist, 2007). An Initial Public Offering (IPO) is defined as the first offer of stock by a private company to the public. IPOs are generally issued by firms seeking or raising capital in order to create a public market in which founders and other shareholders can convert some of their wealth into cash at a future date and the IPO issuers will obtain the assistance of underwriters or investment banks (Ritter and Welch, 2002). Further, an IPO provides access to public fund and so may lower the cost of capital and reflects on the firm's investments and operations. Importantly, IPO companies are expected to contribute to economic development through innovation and job creation (Giudici and Roosenboom, 2004; Takahashi and Yamada, 2015).

Indeed, there are several anomalies of IPOs, the most common one being the '*IPO Underpricing*' phenomenon, which refers to the statistically and economically significant positive initial returns on the first-trading day after going public. Early studies such as Ibbotson (1975) claimed that when firms go public their shares tend to be underpriced, in that the share price jumps substantially on the first trading day. However, the magnitude of underpricing varies substantially from one market to another with IPOs in developed markets being more fully priced than those traded in emerging markets. Therefore, most investors believe that if they subscribe for IPOs, they can make profits and gain high initial returns. Figure 1.1 shows evidence of IPO underpricing across countries. The second anomaly of IPOs is the '*Hot-Issue*' phenomenon, whereby observed IPO activity exhibits significant, and to some extent predictable variations over time. Ritter (1984), Ibbotson *et al*. (1994) and Lowry and Schwert (2002) found that there is a positive association between IPO underpricing and future IPO activity. This indicated that periods of high IPO volume tend to follow periods of high initial returns.

Another important phenomenon is that IPOs tend to underperform company benchmarks in the long-run[1]. Aggarwal and Rivoli (1990) found evidence of substantial negative abnormal returns of IPOs in the long horizon period. They suggested that a reason for long-term underperformance of IPOs is a possible overvaluation in the early aftermarket trading. Ritter (1991) argued that IPO companies intend to go public when investors are over-optimistic about the company's future growth potential. However, while the majority of studies find that IPO firms in general are found to underprice their IPOs (see Figure 1.1), the empirical evidence on the long-run performance of IPOs and the hot-issue phenomenon in each stock exchange is still controversial. Especially for the long-run IPO stock performance, different findings are observed when various methods are used to measure stock market performance in the long-run. There is a debate in the IPO literature (e.g. Loughran and Ritter; Barber and Lyon, 1997; Fama, 1998; Lyon et al., 1999; Gompers and Lerner, 2003) on the measurement problem involved in estimating long-run stock market performance, such as which benchmark to use to estimate abnormal returns and how to construct test statistics.

Consequently, IPO activity has attracted the attention of researchers and policy-makers, leading to a substantial amount of empirical studies in the financial literature. To this end, one can conclude that several important issues have been covered in the previous studies, such as IPO pricing, the operating performance of IPOs, the initial underpricing, performance of IPOs in the long-run, the relation between the economy and the IPOs, and the characteristics of the IPOs (Beatty and Ritter, 1986; Carter *et al*., 1998; Jelic *et al*., 2001; Kirkulak and Davis, 2005; Kenourgios *et al*., 2007; Kirkulak and Davis, 2005; Dimovski, *et al*., 2011; Su and Bangassa, 2011; Chen *et al*, 2004; Su, 2004; Ahmad *et al*., 2011; Costa *et al*., 2013 among others). In particular the empirical IPO literature has become increasingly sophisticated econometrically, focusing on testing variety hypotheses such as asymmetric information, principal-agent, a signal of firm quality, institutional explanations and ownership and control.

[1] See Ritter, 1991; Kooli and Suret, 2004; Álvarez and González, 2005; Akhigbe *et al*., 2006; Mazouz *et al*., 2008; Su and Bangassa, 2011; Thomadakis *et al*., 2012; Wen and Cao, 2013; Agathee *et al*., 2014 and among others. The author intensively details and discusses evidence of long-term performance of IPOs in Chapter 2 Section 2.2.



Note: Year: Period of study; N: Sample size; and IR: Average Initial Return (IPO Underpricing), which is average (usually equally-weighted mean) returns calculated from offering price to the closed price of the first trading day.

Figure 1.1 Selected empirical evidence on the 'IPO Underpricing' phenomenon across countries

With regard to IPOs in Thailand, there are a few empirical studies investigating IPO performance in the long-run (e.g. Allen *et al*., 1999; Chorruk and Worthington, 2010), but they have only used the SET index as a benchmark, with more emphasis on the event-time approach. Their findings indicating that Thai IPOs either over-perform or underperform in the long-run are still mixed. This is due to the fact and problem that the benchmark used may not adequately adjust for risk and the methods used are subject to various statistical biases. In addition, prior studies on the Thai market employ the event-time approach and have not fully addressed the measurement problems which have been subject to intense debate in studies involving long-horizon returns. The author therefore takes steps to address the measurement problems and re-appraises the robustness of existing Thai evidence.

Moreover, there are other studies related to IPO event in the Thai context. For instance, Lonkani and Firth (2005) demonstrated the accuracy of earnings forecasts and its relationship with the information reported in the Thai prospectuses such as the size and age of firms and the leverage ratios and the IPO performance. In the same vein, Ekkayokkaya and Pengniti (2012) examined the governance reform following the 1997 East Asian financial crisis and its effect on Thai IPO underpricing. Recently, Boonchuaymetta and Chuanrommanee (2013) investigated the relationships between the following six major factors, namely underwriter reputation, ownership concentration, book-building, IPO allocation, the length of the silent (lock-up) period, and investor interest and IPO underpricing. However, they never considered how the narrative information reported on the IPO prospectus[2], which plays an important role for IPO investment analysis due to it being the first source of information for the listed company, especially the 'Intended Use-of-Proceeds Disclosure,' affects IPO pricing and the long-term performance of Thai IPOs. Interestingly, there is only a local language version for the Thai IPO prospectuses and the uses of IPO proceeds information is also reported in the small part of the 'Executive Summary' section. Thus, the uniqueness of Thai IPO prospectuses has been closely and carefully studied in the present research.

[2] Firms typically include information such as company background, management structure, financial statements, intended use of proceeds and major shareholders in the prospectus, to assist potential investor for making an informed evaluation about the risk associated with the investment. The IPO prospectus provides insight into which types of information are selected by a listed firm and its underwriter for presenting the firm in relation to investors and analysts (Bukh *et al*., 2005).

Another strand of research pays considerable attention to IPO underpricing and how it allows "good" firms to distinguish themselves from "bad" ones and to improve their external financing in the future (Faulhaber, 1989; Grinblatt and Hwang, 1989; Welch, 1989). Here a good company will find it advantageous to signal its IPO through underpricing, while a weak and poor company will not find such underpricing worthwhile. Indeed, there are several studies claiming that IPO underpricing is a signal of the differenting quality of firms (Jegadeesh *et al*., 1993; Su and Fleisher, 1999; Kennedy *et al*., 2006; Kooli and Meknassi, 2007; Espenlaub *et al*., 2012; Pour and Lasfer, 2013 among others). Interestingly, during the IPO process, IPO stocks have some features that are more likely to be speculated rather than others due to large information asymmetry. Here a few studies (See for example Malkiel, 2003 and Hong *et al*., 2006) show that most of the earlier speculative manias were most prominent for IPOs. Therefore, IPOs should transmit some signals identifying speculative stocks in the secondary market. These issues, such as reexamining the long-term performance of Thai IPOs, any unique information disclosure on the IPO prospectus, and IPOs' signaling for speculative stock detection, are important and have been investigated in this thesis in an attempt to fill research gaps in the IPO field.

For the Thai IPO stock market, the above-mentioned issues are especially interesting to analyze for a number of reasons. First, compared to other countries that have established markets, such as the USA, the UK, Japan, Hong Kong, Singapore and others, the Stock Exchange of Thailand (SET) is a relatively new stock exchange and many public companies have not yet been listed on the Thai market. As can be seen in Figure 1.2, since the establishment of SET in 1975 the total number of listed companies has increased on average by 19 companies per year. On the other hand, there are just about 700 common stocks that are being traded on the Thai stock market. One of the ambitions of SET, therefore, is to stimulate market activity and increase the number of IPOs. Second, the size of IPOs in Thailand is moderately small[3] and the SET requirements to list IPOs differ from those in other countries. This may cause different patterns in Thai IPOs' pricing and thus lead to different price dynamics over time. Third, Thailand has recently joined the ASEAN exchange[4]. The ASEAN trading link system was established in 2012

[3] The SET is the fourteen-largest market in Asia-Pacific by capitalization, thirteen-largest in terms of the number of listed companies (Chorruk and Worthington, 2010).

[4] The ASEAN Exchange is a collaboration of seven exchanges from six South East Asian countries: Indonesia, Malaysia, The Philippines, Singapore, Thailand and Vietnam. This alliance aims to promote the growth of the ASEAN capital markets by streamlining access to ASEAN stocks, introducing cross-border harmonization, and also creating ASEAN-centred products.

and is designed to enable investors to trade stocks from exchange to exchange more easily. There are now three exchanges that are connected to the ASEAN link system: the Bursa Malaysia, the Singapore Exchange and the Stock Exchange of Thailand. As a result, through their local brokers, investors in Malaysia and Singapore can, for instance, conveniently trade in SET and MAI stocks including Thai IPOs. In the future, Indonesia, the Philippines and Vietnam will also gain access to the ASEAN link system. Finally, Thailand is relatively small and sparsely traded market, but is nevertheless quite well integrated into the global market. The above argument justifies the rational reasons supporting why this thesis focuses on the IPO market in an emerging country, particularly Thailand.

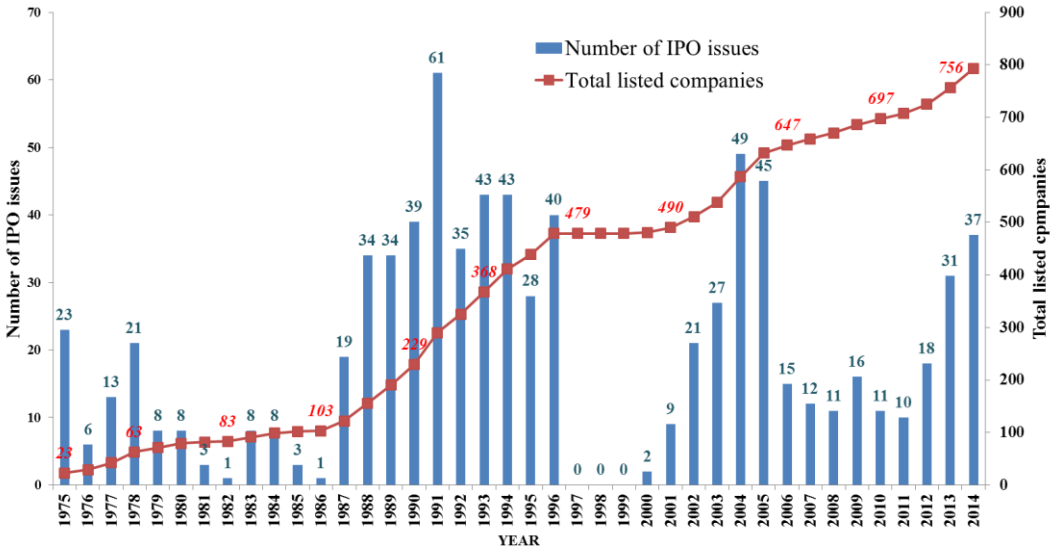


Figure 1.2 Number of IPOs and existing companies on the SET, 1975-2014 (Adapted from Chorruk and Worthington, 2010)

1.2 The Thai Stock Market and the IPO Market Background

This section provides information about the Thai stock market characteristics including the Thai capital market, the IPO activities and process, and also the legal, regulatory and reporting framework for Thai companies.

1.2.1 The Stock Exchange of Thailand (SET)

In 1972, the Thai government published the document "Announcement of the Executive Council No.58 on the Control of Commercial Undertakings Affecting Public Safety and

Welfare". This allowed the government to control the operations of finance and securities companies which until then had operated freely. These amendments preceded long-awaited legislation establishing "The Securities Exchange of Thailand" that was finally enacted in May 1974. This was followed by revisions to the Revenue Code at the end of the year, allowing the investment of savings in the capital market. By 1975 the basic legislative framework was in place and then "The Securities Exchange of Thailand" officially started trading on April 30, 1975. On January 1, 1991 its name was formally changed to "The Stock Exchange of Thailand" or SET[5].

The Securities and Exchange Act of 1992 (SEA) stipulates that the Securities and Exchange Commission (SEC), a single unified supervisory agency, be the regulator of the Thai Capital Market. Thus, the SEC oversees the development of the capital market but the Bank of Thailand (BoT) takes responsibility for the money market. The SEA also provides a clear separation between the primary and the secondary markets to facilitate their successful development. However, both primary and secondary markets are regulated by the SEC. A company that wishes to issue new securities must first apply for SEC approval and comply with its filing requirements. Then, the SEC needs to ascertain the financial status of the company before allowing the firm to issue securities to the public. Following the IPO, securities will subsequently be traded in the secondary market once the issuer has applied for and been granted approval by the SET. The roles of the Stock Exchange of Thailand are defined in the SEA (1992) as follows: i) To serve as a centre for the trading of listed securities and to provide the essential systems needed to facilitate securities trading; ii) To undertake any business relating to the Securities Exchange, such as a clearing house, a securities depository centre, a securities registrar; iii.) To undertake any other business approved by the SEC. The regulatory frame work of the Thai capital market is shown in Figure 1.3.

[5] The beginning of the modern Thai capital market came about as a result of the National Economic and Social Development Plan No.1 (1961-1966), which aimed to support economic growth and stability and to develop the quality of life of the Thai people. In July 1962, a private group established an organized stock exchange as a limited partnership. Its name changed to the "Bangkok Stock Exchange Co., Ltd." in 1963. However, it was unsuccessful due to not having any government support and having a lack of investment knowledge and understanding. As a result, trading volume decreased sharply from 114 million Baht in 1968 to 28 million Baht in 1972, by which time the National Economic and Social Development Plan No.2 (1967-1971) had been launched to support the establishment of a formal stock exchange for the first time in Thailand focusing on the significant role of additional capital to enhance the economy and industry.

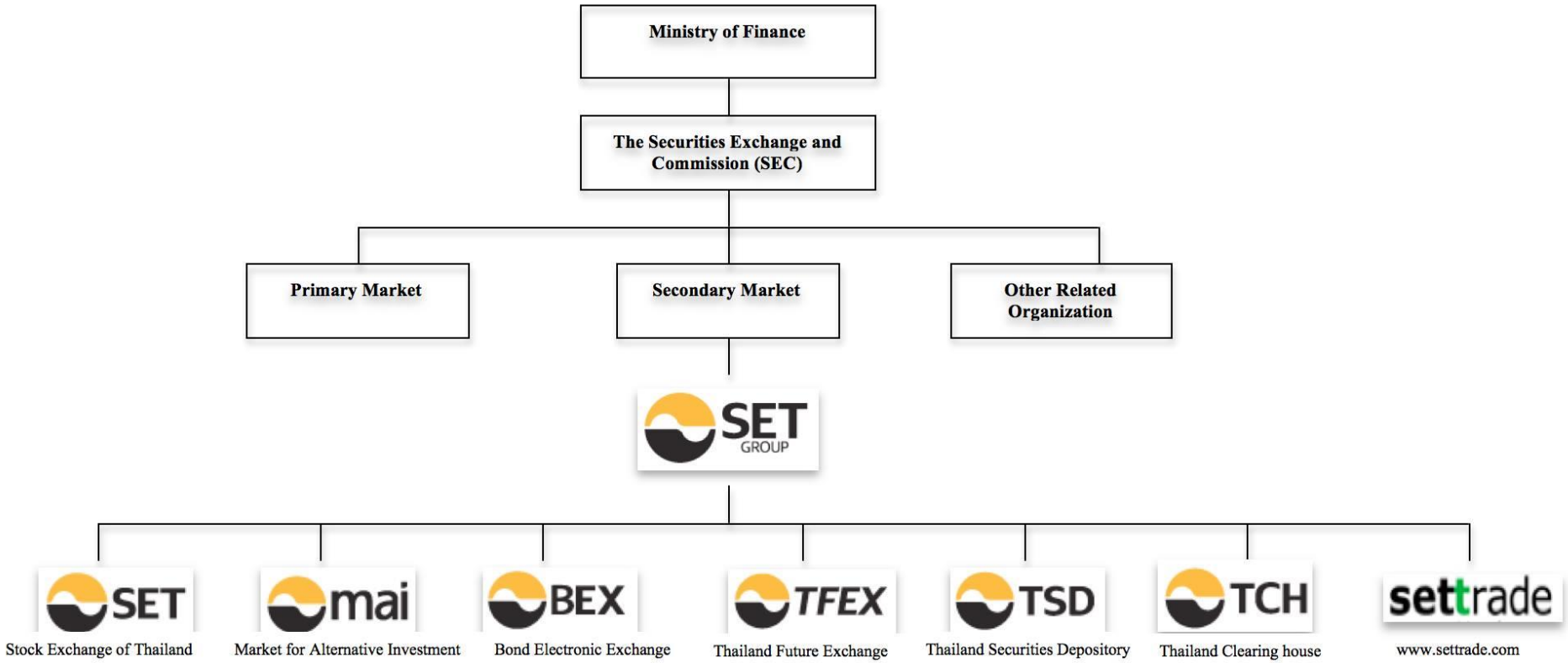


Figure 1.3 Regulatory Framework of the Thai Capital Market (Source: The SET's website, 2015)

1.2.2 Market for Alternative Investments (MAI)

The Market for Alternative Investments (MAI), or the sub-market, was established in 1999. It is a source of funding for small or medium-sized enterprises, having over 20 million Baht (or £4 million, 1 GBP: 50 Baht) in paid-up capital after IPO. However, as far as firms applying to the Securities Exchange Commission (SEC), Thailand for an IPO are concerned, there are slight regulatory differences (see Appendix 1B, Pages 17-21).

The MAI's purpose is to create new fund-raising opportunities for innovative business with high potential growth as well as to provide a greater range of investment alternatives. Its vision and mission are to provide new opportunities for long-term quality growth and to enable entrepreneurs and small and medium-sized firms to access funds, to achieve sustainable growth through transparency and good governance and to strengthen their competitiveness through powerful networking.

1.2.3 Differences between SET and MAI Markets

The main differences between SET and MAI are as follows. The SET is a market for large companies with a requirement of more than 300 million Baht in paid-up capital after IPO to raise long-term funds. Paid-up capital is defined as a company's capital that has been funded by shareholders. Paid-up capital represents money that is not borrowed. It is usually less than a company's total capital because a company may not issue all of the shares that it has been authorized to sell. A company that is fully paid-up has sold all available shares and then cannot raise its capital, except by borrowing money through debt, or being authorized to sell more shares. In contrast, the MAI market is a source of funding for small or medium-sized enterprises with a requirement of over 20 million Baht in paid-up capital after IPO. The MAI market's listing criteria and regulations are more flexible than those in the case of SET in terms of the lower paid-up capital required, the fewer consecutive years prior to the qualifying period required for listing, the requirement of fewer minority shareholders after public offering (≥300 shareholders for MAI and ≥1,000 shareholders for SET) and the lower application fees than those for the SET market companies. The MAI's purpose is to create new fundraising opportunities for innovative business with high growth potential as well as to provide a greater range of investment alternatives. Its mission is to provide new opportunities for long-term quality growth and to enable entrepreneurs and small-size or medium-size firms to access funds,

to achieve sustainable growth through transparency and good governance, and to strengthen competitiveness through networking.

In addition to this information service, the SET plays an important role for listed companies by issuing their securities to the public. They rigorously verify the company before issuing the securities to the public and they also cooperate with the SEC in order to protect the interests of investors. The following section briefs about listing regulations for new equities.

1.2.4 Listing Regulations for Common Stocks

To expand business for a company, the public offering of securities is an alternative financing option that has a lower cost than borrowing from financial institutions. Before actually offering securities in the primary market, it must be approved by the Securities and Exchange Commission (SEC). After that, the securities can be traded in the secondary market or on the Stock Exchange of Thailand (SET), which is a channel to increase liquidity for public companies. The exchange also places importance on the overall quality of listed companies by improving the standard of the listing rules and regulations. All listed companies must follow all the SET's listing requirements and only then can they obtain listing status.

For listed companies, SET assists them to gain sources of long-term capital. They can also use funds for expanding their businesses, setting up an appropriate structure and enhancing their competitiveness. In addition to issuing common stocks, a listed firm can raise further capital by issuing preferred stocks, warrants, bonds and convertible bonds. As a result, a listed company receives a positive image and gains in reputation and public acceptance due to its transparent information disclosure. These advantages perhaps aid listed firms to enhance their creditability and bargaining power. Moreover, listed company status can influence foreign investors, increasing the participation of such investors. Listed company status gives more confidence to public investors. In public firms, the management must be accountable to shareholders. An additional benefit of being a listed company is human resource development for when a company has a good image, a well-respected reputation and public acceptance, it will attract many applicants who would like to be employees of such a company. The company can thus employ high-quality and particularly skilled workers. More interestingly, a listed firm obtains tax

privileges from holding shares in other companies incorporated under Thai law, laws governing mutual funds, or the Industrial Finance Corporation of Thailand Act. Any dividend received from such firms will be tax exempt. However, such dividends must be received from stocks or investment units that have been invested in by the listed firms for at least three months both before and after the date of the dividend payment.

For shareholders, listed company stocks must be traded in the secondary market. Therefore, investors can buy or sell their stocks frequently due to high liquidity in the exchange market. In addition, they can use shares as collateral for loans because the market value of the company can be more easily estimated. The benefits of investors are also protected by SET rules and regulations due to securities trading and the disclosure of listed company information. Individual shareholders of listed companies will receive tax privileges. For instance, the proceeds from the sale of listed securities will be exempt from personal income tax.

The listing criteria depend on the SET's policy of improving the quality of listed companies. The SET focuses on financial information disclosure, management and good corporate governance practices, in particular, the sufficiency of and timeliness of access to information. Thus, all investors should receive significant information relevant to investment decisions at the same time. To have a complete listing status on SET, the company is required to have all of these qualifications (See more details in Figure 1A and Tables 1B-1F, Appendix 1B, Pages 17-21). Once the companies go public, they are categorized into 8 major-sectors (Agro & Food, Consumer Product, Financial, Industrial, Resources, Services, Property & Construction and Technology), depending on the listed companies they come from and in which particular industry they are in (see Table 1A in Appendix 1A, Pages 16).

1.3Aims, Motivations and Contributions

This thesis is composed of three IPO empirical studies focusing on Thai-listed companies. This chapter is followed by the three empirical works on the Thai IPO performance, IPO information disclosures and IPOs' signalling, which comprise Chapters 2, 3 and 4. Each chapter has its own literature review, description of the research method and empirical findings.

Statistical inference is problematic when the abnormal returns on individual IPOs overlap, as they do when multi-year buy-and-hold returns are applied. Indeed, this is a problem for Thai long-term performance studies (e.g. Allen *et al*., 1999; Chorruk and Worthington, 2010), not just those examining IPO performance. These measurement issues have been addressed in this study. An alternative statistical approach that avoids the overlap problem with buy-and-hold returns is to measure abnormal returns in calendar time rather than event time. To the best of my knowledge, the author has applied the Fama-French (1993) 3 factors and the Carhart (1997) 4 factors to unique Thai data for the first time. The use of this approach, which has not been adopted in prior Thai studies, may serve as a control for the cross-sectional dependence of observations that is inherent in the event-time approach used in previous Thai studies. Therefore, chapter 2 reviews prior empirical studies relating to IPO performance in the long-run and re-examines aftermarket abnormal returns for Thai IPOs. Two broad research questions are addressed: *'How do Thai IPO companies perform relative to several benchmarks in the long-run?'* and *'Do both event-time and calendar-time approaches produce the same results'*. The first empirical study in this thesis aims to investigate the long-term performance of IPOs for companies listed on the Thai stock market, to re-examine the robustness of existing empirical evidence using a variety of different methods to calculate abnormal returns by applying different market benchmarks and by using more robust statistical tests and to compare results of the performance of Thai IPOs between using the event-time approach and the calendar-time approach. The first study, on the other hand, provides a more extensive contribution to the literature by not only using a more up-to-date dataset than the data samples used in previous studies on the IPO market in Thailand, but also by analyzing the IPO performance in two stock market segments, namely, SET and MAI. In addition, there is the problem resulting from the existence of evidence that benchmark selection can have an important impact on the magnitude of abnormal returns in such event studies (Espenlaub *et al*., 2000). In order to mitigate this problem, this study compares abnormal returns in relation to a number of alternative benchmarks. The analysis of long-term IPO performance in Thailand is therefore more extensive than in previous studies and the author provides a number of robustness checks of our findings by employing the Capital Asset Pricing Model (CAPM), the Fama-French (FF) three-factor model and the Size-Decile portfolio (SD) model in the event-study analysis. Furthermore, the cross-sectional pattern of IPO performance in the long-run was further analysed in relation to industry classifications. To the best of my knowledge, this is the first time that such an investigation for the Thai stock market has been conducted, and it is also the first

time this has been done when eight industry indices have been employed as benchmarks. This study further presents more results for robustness purposes using a calendar-time approach.

Chapter 3 deals with endogenous disclosure of the intended use-of-proceeds and the short- and long-run performance of IPOs. The second empirical study, which is also described in this Chapter, relates to the disclosure of the intended use of IPO proceeds and addresses the following research questions: '*Do the levels of information disclosures affect IPO underpricing and long-run performance*?', *Do* the *types of use-of-proceeds impact on the performance of IPOs, and if so, in what way?*and '*Which important factors can determine the performance of IPOs*?' Chapter 3 aims to investigate the characteristics of the IPO market and of IPO underpricing, to discover the market structure and performance of IPOs in relation to the level of the use-of-proceeds disclosures that are generally reported in Thai IPO prospectus files and to study the effect of types of use-of-proceeds on IPO underpricing and IPO aftermarket returns. The second empirical work in this thesis contributes to the IPO literature in several ways. The author made use of the intended use-of-proceeds disclosure index for measuring the level of the disclosure and also hand-collected unique data on IPO subscription rates by foreigners and institutional investors as our additional proxies using electronic documents from the SEC library. These represent a shift compared to past empirical literature that focused on the presence or absence of forecast disclosure. The second empirical chapter will contribute to the knowledge of the usefulness of the prospectus information, especially narrative information such as the use-of-proceeds, to price the IPOs. Later in the research design, it is argued that the determining factors affecting both levels of IPO prices may explain the underpricing as well as the long-run performance facts. To the author's knowledge, this study is the first to investigate the relationship between the intended use-of-proceeds and IPO underpricing and the long-run performance of IPOs simultaneously. Leone *et al*. (2007) and Singh and Van der Zahn (2007) examined relationships between the use-of-proceeds and intellectual capital disclosure and IPO's cost of capital. Chahine and Filatotchev (2008) studied the effects of information disclosure and board independence on IPO underpricing and long-term underpricing. Apart from the IPO discount issue, Wyatt (2014) recently also investigated useful information in use-of-proceeds disclosures in the IPO prospectus associated with the survival of a firm. Additionally, there are a number of studiess examining the use-of-proceeds and long-term performance of either IPOs or SEOs (Jeanneret, 2005; Autore *et al*., 2009; Suzuki and

Yamada, 2012; Nielsen *et al*., 2015). Apart from the conventional *t*-test, the author employs a wider range of statistical tests including the bootstrapping simulation and non-parametric tests in order to verify the validity of the results.

Chapter 4 explores the linkage between IPO underpricing and the aftermarket abnormal return and the likelihood of being speculative stocks (so-called Turnover List stocks). The details of this empirical study are given in Chapter 4. This study addresses the research question: '*Do the nature and extent of the initial returns of IPOs and after-market returns explain the probability of stocks appearing on the Turnover List, and if so, in what way?*' and '*Are IPOs stocks more speculated than non-IPO stocks?*' In the third empirical study of this thesis, the author aims to examine the nature and extent of the initial returns of IPOs and after-market returns to explain the probability of stocks appearing on the Turnover List applying IPO signaling, market-feedback and price manipulation models and to study the relationship between nature of IPOs and non-IPOs and the risk of being speculative stocks. In the last section of Chapter 4, the author extends the sample to a panel dataset, consisting of Thai IPO and non-IPO companies, excluding financial companies, real estate investment trusts and closed-end investment funds, for the same period. For the last empirical study, to best of the author's knowledge, Turnover List stock has not been drawn on the previous literature.

This thesis represents the first comprehensive study of equity IPOs in Thailand, investigating both short- and long-run performance, the use-of-proceeds disclosure, and IPOs' signalling for speculative stock detection. The research undertaken is important because it investigates an issue that has not sufficiently addressed in Thailand. Although there has been tremendous growth in the Thai IPO market, shown by the increasing numbers of listed companies on the Stock Exchange of Thailand, from just 229 firms at the beginning of 1990 to 756 firms at the end of 2014 (see Figure 1.2), research on 'going public' in Thailand is relatively limited as mentioned in section 1.1.

1.4 Outline of the Thesis

This thesis is organized into 5 Chapters, including this Chapter 1, which contains an introduction to the thesis. Chapter 2 re-appraises the long-run performance of Thai IPOs. Chapter 3 details the endogenous disclosure of use-of-proceeds affecting IPO underpricing and IPO performance in the long-run. The evidence of IPOs' signaling for the detection of speculative stocks is reported in Chapter 4. Chapter 5 is the conclusion of this thesis.

Appendix 1A

Table 1A SET Industry Groups and Sector Classifications

Industry	Sector	
1. Agro & Food Industry (AGRO)	AGRI	Agribusiness
	FOOD	Food & Beverage
2. Consumer Products (CONSUMP)	FASHION	Fashion
	HOME	Home & Office Products
	PERSON	Personal Products & Pharmaceuticals
3. Financial (FINCIAL)	BANK	Banking
	FIN	Finance & Securities
	INSUR	Insurance
4. Industrial (INDUS)	AUTO	Automotive
	IMM	Industrial Materials & Machinery
	PAPER	Paper & Printing Materials
	PETRO	Petrochemicals & Chemicals
	PKG	Packaging
	STEEL	Steel
5. Property & Construction (PROPCON)	CONMAT	Construction Materials
	CONS	Construction Services
	PF & REIT	Property Fund & REITs
	PROP	Property Development
6. Resource (RESOURC)	ENERG	Energy & Utilities
	MINE	Mining
7. Services (SERVICE)	COMM	Commerce
	HELTH	Health Care Services
	MEDIA	Media and Publishing
	PROF	Professional Services
	TOURISM	Tourism &Leisure
	TRANS	Transportation & Logistics
8. Technology (TECH)	ETRON	Electronic Components
	ICT	Information & Communication Technology

Note:
The Thai stock exchange categorizes equities into 8 sectors, depending on the listed companies they come from and in which particular industry they are in (Source: the SET's website, 2015).

Appendix 1B

Table 1B Qualifications of the applicant

	Qualifications
Applicant status	Public limited company or corporation established under a special law
Paid-up capital for common stocks	≥ THB 300 million (after public offering)
Distribution of minor shareholding Number of minor shareholders (non-strategic shareholders) 'Strategic shareholders' refer to directors and managers, including related persons and associated persons and shareholders who have a holding of above 5%	≥ 1,000 shareholders Hold ≥ 25% paid-up capital for companies with THB 300 million ≤ paid-up capital < THB 3,000 million. Hold ≥ 20% of paid-up capital for companies with paid-up ≥ THB 3,000 million.
Public offering Approval Number of shares cumulatively offered for sale - Paid-up capital < THB 500 million - Paid-up capital ≥ THB 500 million Method of public offering	 Has been granted approval by the SEC ≥ 15% of paid-up capital ≥ 10% of paid-up capital or THB 75 million, whichever is higher Offering via an underwriter
Track record	- Must have been in operation for at least 3 years - Must have had the same company management for at least one year prior to the application date - Must have had a net profit as follows: Achieved a minimum net profit of THB 50 million over the past 2 or 3 years, a net profit from operations of THB 30 million for the previous full-year and a net profit in the year of filing the listing application as reported by combining all quarterly results for that year. - For a privatized state enterprise, operations prior to privatization will be considered as a continuation of operations.

(Source: the SET's website, 2015)

Appendix 1B

Table 1B Qualifications of the Applicant (Continued)

	Qualifications
Financial Condition and Liquidity	- Be in a stable and healthy financial condition and have sufficient working capital. - Have a minimum total shareholders' equity of THB 300 million.
Management - Management and control persons - Scope of duties and responsibilities	Qualifications for management and control persons should be in line with SEC regulations and they should not possess any characteristics prohibited by SEC rules and regulations. Duties and responsibilities must be clearly defined as specified by SEC rules and regulations.
Corporate governance and internal control	- Have good corporate governance in practice Have an audit committee qualified by SET. - Have effective auditing and internal control systems as specified by the SEC.
Conflict of interest	Must have no conflict of interests as specified by the SEC.
Articles of Association of the applicant	Must ensure that the articles of association of the applicant and its subsidiaries are in line with the SEC rules and regulations.
Financial statements and auditors	Must ensure that financial statements have been prepared in accordance with the SEC rules and regulations. The applicant's auditor must also be approved by the SEC, Thailand.
Provident fund	The provident fund of the applicant must already be established on the date on which the listing document is filed.

Note:
If it is deemed that the admission of the issuer is beneficial to the Thai stock market, the Board of Governors of the Stock Exchange of Thailand (SET) accepts the listing of the issuer by relaxing the quantitative listing criteria as deemed appropriate (Source: the SET's website, 2015).

Table 1C Additional Requirements for Companies Engaged in Infrastructure Projects

	Additional requirements
Nature of Business	Have a concession period of ≥ 20 years with ≥ 15 years remaining as of the application date, or obtain specific permission from a government agency/state enterprise, or possess a contract to sell products/services which can generate stable revenues.
Source of Finance	Possess confirmed and sufficient sources of finance

(Source: the SET's website, 2015)

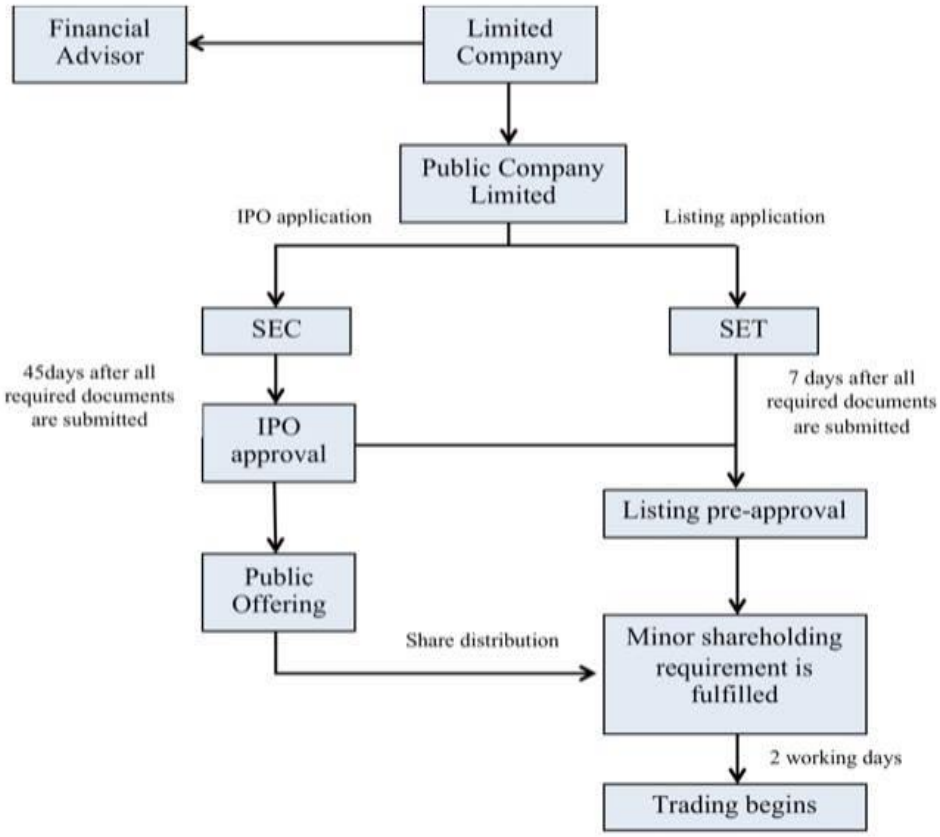


Figure 1A Listing Procedures (Adapted from the SET's website, 2015)

In general, the applicant spends a total of 6 months in the preparation stage (the period before submitting a listing application to the exchange) of listing common shares. Table 1F summarizes the information on the preparation for the listing of common shares and the listing fees. The preparation period is an estimate based on the assumption that the overall qualifications of the applicant primarily comply with the SET listing requirements with only a few adjustments, should the applicant require any. More importantly, strategic shareholders who hold at least 55% of the total shares of the firm's paid-up capital after the IPOs are prohibited from selling their shares during the first 6 months after going public. This is known as 'the silent (quiet) or lock-up period'. In general, such a silent period in the Thai stock market is required for 1 year after listing. Strategic shareholders such as directors, managers and executive management, including related and associated persons will be permitted to sell a maximum of 25% of the locked-up shares every six months afterwards. Such firms that have secondary listing are exempted from the silent period rule. This also precludes stock analysts affiliated with an underwriter from covering the stock of an IPO for the same period. Before issuing new securities to the public, an issuer must produce 'A Prospectus' which is a document describing the

security offering and its financial conditions with the help of its underwriter. The due diligence investigation helps assemble the information needed to meet the SEC filing requirements.

Table 1D Preparation for Listing of Common Shares

Duration	Descriptions
Between 3 and 6 months before listing application filing	- Find out relevant rules and regulations such as the Public Company Act, SEC rules and regulations governing the issue and the public offering of securities, and SET listing rules and regulations - Appoint a financial advisor approved by the SEC and discuss with a financial advisor how to ensure the applicant's qualifications - Restructure shareholding, establish a good corporate governance and get rid of any conflict of interest - Prepare financial statements and reports in accordance with accounting standards - Establish an audit committee and appoint independent directors
Between 2 and 5 months before listing application filing	- Transform into a public limited company - Prepare an Initial Public Offering (IPO) application and relevant documents - Make a plan for pricing and allocating IPOs
Between 1 and 2 months before listing application filing	- Establish provident fund - Appoint share registrar and submit IPO documents to the SEC - Submit IPO application to the SEC - Prepare for company visit and interviewing by the SEC officers
Within 7 days of consideration of a listing application by the SET after all required and relevant documents have been submitted	- Submit a listing application to the exchange - Prepare for company visit and interviewing by the SET officers (The SET and SEC visit the applicant together in the case of a parallel application filing) - Distribute shares to the public and report the share distribution documents to the SET - First trading begins within 3 days after the share distribution and other required documents have been submitted to the exchange

(Source: the SET's website, 2015)

Table 1E Listing fees

Application fee	Initial fee	Annual fee
THB 50,000	0.05% of paid-up capital Minimum THB 100,000 Maximum THB 3,000,000	Regressive rate varies by the level of paid-up capital as follows: (capital: million baht) rate < 200 0.035% 200 < capital ≤ 1,000 0.030% 1,000 < capital ≤ 5,000 0.025% 5,000 < capital ≤ 10,000 0.020% > 10,000 0.010% Minimum THB 50,000 Maximum THB 3,000,000

(Source: the SET's website, 2015)

Table 1F Descriptive Disclosure of Material Information

Disclosure of material information	Description
Information reported on a regular basis	- Quarterly review of financial statement (within 45 days from the end of the accounting period) - Audited financial statements (within 3 months from the end of the accounting period) - Annual report and an AGM notice (within 110 days from the end of the fiscal year accounting period) - Disclosure report for additional information (Form 56-1) (within 3 months from the end of the accounting period)
Additional information reported (may be required)	- Immediate public disclosure of information is likely to have an effect on the price of the company's securities, the interests of shareholders, or investment decisions such as a capital increase or decrease, a dividend payment or a non-dividend payment, and a merger or an acquisition of assets. - Information to be reported to the SET within 3 working days from the date on which such incidents occur such as a change of a board member on the company's board of directors, and change in the company's memorandum of association. - Information to be reported to the exchange within 14 days such as a copy of the shareholder name list as of the closing date of the share transfer, and a report of the ordinary or extraordinary general meeting of shareholders.

CHAPTER 2

LONG-RUN PERFORMANCE OF INITIAL PUBLIC OFFERINGS (IPOs)

Chapter 2

Long-Run Performance of Initial Public Offerings (IPOs)

2.1 Introduction

The IPO underpricing phenomenon has existed for a long time in world stock markets, although its magnitude varies from country to country. However, the evidence regarding IPO over-performance or underperformance in the long-run is mixed. Some studies have found that IPOs show underperformance in the long-run or have negative abnormal returns over different holding periods after the IPO issue date (Ritter, 1991; Lee *et al*., 1996; Kooli and Suret, 2004; Álvarez and González, 2005; Akhigbe *et al*., 2006; Mazouz *et al*., 2008; Su and Bangassa, 2011; Thomadakis *et al*., 2012; Wen and Cao, 2013; Agathee *et al*., 2014). This finding implies that in the initial period after the IPO flotation, IPO investors earn positive returns, but that the returns from their investments are subsequently reduced in the long-run. In contrast, however, the findings of Jelic *et al*. (2001), Ahmad-Zaluki *et al*. (2007), and Moshirian *et al*. (2010) have all demonstrated IPOs' long-run over-performance using market index benchmarks in certain countries, such as Malaysia, China and Korea. This mixed picture regarding IPOs' long-term performance may be related to the application of different methods and approaches used to measure the abnormal returns.

Chapter 2 aims to study the long-term performance of IPOs for companies listed on the Thai stock market and to re-examine the robustness of existing empirical evidence using a variety of different methods to calculate abnormal returns by applying different market benchmarks and by using more robust statistical tests. The data sample in this study is comprised of a total of 227 IPOs listed on the Thai stock market in the period between 2001 and 2012.

The remainder of this chapter consists of five sections. Section 2.2 gives an overview of the existing literature on the long-run IPO performance relevant to this study. Section 2.3 presents the methodology and alternative techniques to evaluate the abnormal performance of IPOs. Data and samples are explained in Section 2.4, while the empirical

results and a discussion of the findings are provided in Section 2.5. Section 2.6 then concludes Chapter 2.

2.2 Related Literature

2.2.1 Prior studies on the long-run performance of IPOs

Most of the existing studies from various stock markets around the world provide evidence showing IPO underpricing or revealing their outperformance in the short-run. In contrast, the results of IPO over-pricing or underperformance in the long-run are puzzling. The behaviour of IPO returns in the long-run has attracted much attention in the literature in recent years. The empirical evidence tends to support the view that IPOs underperform. For instance, a study by Ritter (1991), using US market data, investigated IPO underperformance in the long-run and found that three-year market-adjusted buy-and-hold returns were -23.4% and also that they were negative in every sub-period. In his study, Ritter applied alternative benchmark portfolios to find out whether measurement problems could account for the underperformance of IPOs in the long-run. Additionally, he investigated possible explanations for IPO performance by categorising his sample by gross proceeds, initial returns, industry, issuing year, and age of firms. Ritter (1998) attributed such long-term underperformance to the fact that IPO investors are over-optimistic about IPO valuations whereas there is much uncertainty concerning the value and growth of the IPO companies. In consequence, investors overpay for IPOs in the initial period of listing.[6] However, when more information becomes available in the subsequent period, the differences in opinions between optimistic and pessimistic investors are reduced. As a result, the IPO price declines after going public, or when the investors receive more information about the company. In a more resent study on the US market, Akhigbe *et al*. (2006) studied the long-term performance of 2,483 IPOs by using industrial sector classifications. They reported that the mean one-, two- and three-year buy-and-hold abnormal returns of the IPO firms were -27.07%, -19.05% and -10.16%, respectively. In addition, Wu and Kwok (2007) investigated the long-run performance of global and domestic IPOs of a number of US companies from 1986 to 1997, and found that both global and domestic IPOs underperformed the market index up to three years

[6] Lonkani and Firth (2005) argue that buying stocks in an initial public offering is more risker than investing in already listed companies due to the lack of information. Information asymmetries between management and potential investors are uncertainties investors face when deciding whether or not to subscribe to new issues.

after going public. They indicated that if investors bought the IPO stocks at the end of the offer month and held them for one-, two- and three- years, they would suffer a negative abnormal return of -1.58%%, -7.81% and -10.63%, respectively, for global IPOs; and -3.94%, -10.78% and -11.48%, respectively, for domestic IPOs.

In the UK, Goergen *et al*. (2007) studied 252 IPOs listed on the London Stock Exchange between 1991 and 1995. They found poor long-run performance of UK IPOs, in particular in cases of those of the smaller firms while those of the large firms performed better in their cross-sectional study. This finding is consistent with the results of Burrowes and Jones (2004), who found long-run underperformance or negative returns from Alternative Investment Market (AIM[7]) IPOs during the initial two years. In addition, Lee *et al*. (1996) investigated the short- and long-run returns of 266 Australian IPOs during the period 1976-1989. They also showed that the equally-weighted Cumulative Abnormal Return (CAR) at month 36 was -51.26%. Further, Lee *et al*. (1996) suggested that the performance of Australian IPOs was considerably poorer than that of the US IPOs reported in Ritter's (1991) study. In another study, Kooli and Suret (2004) examined the aftermarket performance of 445 Canadian IPOs in the period up to 5 years after their listing.[8] Kooli and Suret's (2004) results indicate that IPOs' underperformance in the long-run is not always statistically significant, depending on the methodology used. Similarly, Jakobsen and Sørensen (2001) investigated 76 Danish non-financial firms listed between 1984 and 1992. They also found, after considering buy-and-hold returns and cumulative abnormal returns, that the performance of the stock market was better than that of the IPOs. The volatility adjusted underperformance of five-year post-issue IPOs, relative to the market, was 30.4%. The resultsof Jakobsen and Sørensen (2001) also show the underperformance of Danish IPOs compared to the stocks of matching firms[9]. Furthermore, the findings of Brounen and Eichholtz (2002) document the poor performance of property IPOs in the UK (-4.53%) and in France (-12.62%) but the over-performance of IPOs in Sweden (18.89%). Kirkulak (2008) reported the

[7] The Alternative Investment Market (AIM) was established on 19 June 1995by the London Stock Exchange (LSE) for the flotation of shares of small, young,or growing firms. AIM was created with the primary objective of providing such companies with the opportunity to list their stocks on a regulated exchange, allow them to gain access to the public equity market, and improve their visibility.

[8] Kooli and Suret (2004) studied 445 Canadian IPOs listed on the Toronto Stock Exchange (TSE), Montreal Stock Exchange, Vancouver Stock Exchange, Alberta Stock Exchange (ASE) and over-the-counter (CDN) between 1991 and 1998.

[9] For each IPO stock, Jakobsen and Sørensen (2001) selected a stock of a matching (similar) firm of approximately the same size according to the market value quoted on the Copenhagen Stock Exchange.

underperformance of Japanese IPOs and documented average three-year equally-weighted BHARs of -34.5% and CARs of -18.3% for 433 IPOs between 1998 and 2001.

In an Asian context, Mazouz *et al*. (2008) investigated the long-term performance of 537 IPOs in Hong Kong from 1990 to 2002 and reported that three-year average CARs (using an equally-weighted portfolio) were -74.83%, when the market index was considered as a benchmark, and -17.78% (using both the value and the size index). Moreover, also in an Asian context, Su and Bangassa (2011) demonstrated a potential loss for investors who buy-and-hold Chinese IPOs in the long run.[10] This result supports the findings of Chen *et al*. (2000) concerning poor post-issue performance after listing. It contrasts, however, with the results from the study of Ahmad-Zaluki *et al*. (2007) which showed that investors buying IPOs in Malaysia on the first day of trading and holding them for a three-year period could gain significant abnormal returns for equally-weighted event time CARs and BHARs using two market benchmarks[11]. Moreover, these findings support the results of Jelic *et al*. (2001), who reported positive and statistically significant long-term returns up to 3 years after listing for Malaysian IPOs during the period from 1980 to 1995. More interestingly, Ahmad-Zaluki *et al*. (2007) also found that the long-run performance of large firms is inferior to that of small IPO firms. There exists further international empirical evidence showing poor IPO performance in the long-run (Álvarez and González, 2005; Thomadakis *et al*., 2012, Wen and Cao, 2013; Agathee *et al*. 2014, among others)[12].

2.2.2 Thai long-run IPO performance studies

Specifically in the Thai context, Allen *et al*. (1999) pioneered investigations into the long-run performance of IPOs in Thailand. They studied 151 IPOs listed on the main board of the Stock Exchange of Thailand (SET) from 1985 to 1992. Allen *et al*. (1999) reported that the long-run abnormal returns of Thai IPOs, based on the equally-weighted cumulative market-adjusted return (CAR) in month 36 after listing, was 10.02% and that

[10] Su and Bangassa (2011) found that the mean market-adjusted one-, two-, and three-year BHARs were -16.24% (*t*-stat = -6.57), -12.65% (*t*-stat = -4.44)and -21.74% (*t*-stat = -2.89), respectively.

[11] Ahmad-Zaluki *et al*. (2007) used a benchmark which partially takes into account the different sizes of Malaysian IPOs by adopting the more representative Exchange Main Board All Share (EMAS) Index for Main board IPOs together with the Second Board Index for companies listed on this board in a reference portfolio.

[12] For example, the findings of Thomadakis *et al*. (2012) show a long-term adjusted outperformance of first (40.82%) and second holding year periods (13.49%) and adjusted underperformance at the end of the third year of issue holding (-15.35%). Álvarez and González (2005) revealed the existence of negative abnormal returns for the Spanish stock market. The recent studies of Wen and Cao (2013) and Agathee *et al*. (2014) document IPOs' poor performance in the long-run in Taiwan and in Mauritius.

it was not statistically significant. They also showed that the long-term return was higher when a value-weighted portfolio of IPOs was used. These findings contrast with the empirical results of Chorruk and Worthington (2010), who investigated the performance of IPOs on the Stock Exchange of Thailand (SET) during the more recent period of 1997-2008 and found that Thai IPOs underperformed relative to the market at the end of a 3-year post-listing period when they were measured by the equally-weighted cumulative and buy-and-hold abnormal returns. In the context of this type of event studies, Fama (1998) introduced the concept of the so-called "bad model problem" and argued that although it is less serious in the case of the short-run returns, it becomes more severe when longer return horizons are analysed, which may then lead to counterfeit abnormal average return results. In consequence, the findings of the previous studies for the Thai IPO stock market may not be sufficiently reliable and, hence, it is worthwhile re-examining them.

There are a few major differences between the previous event studies of the long-run performance of Thai IPOs (Allen *et al.*, 1999; Chorruk and Worthington, 2010) and the analysis conducted in this current study. Firstly, Allen *et al.* (1999) used only cumulative market-adjusted return (CAR) to measure abnormal returns in the long-run, and Chorruk and Worthington (2010) added buy-and-hold abnormal return (BHAR) and wealth relative (WR) when measuring the long-run IPO performance. Fama (1998) and Mitchell and Stafford (2000) also suggest that BHAR has more statistical problems than CAR due to a positive skewness bias[13]. This leads to the negative bias of the standard *t*-statistics. In order to address the inference problems of BHAR as a performance measure, Lyon *et al.* (1999) developed new techniques, such as a skewness-adjusted *t*-test. Unfortunately, the previous studies of the long-term performance of the IPOs in Thailand were unaware of the skewness bias issue. Furthermore, Chorruk and Worthington (2010) studied the performance of Thai IPOs listed during the Asian financial crisis period, also known as

[13] Fama (1998) argues that if the mean of CAR increases as *N*, i.e. the number of months summed, the standard error of the CAR increases in proportion much more slowly, i.e. as $N^{1/2}$. In an average of monthly abnormal returns (ARRs), the pricing error is constant, but the standard error of the CAR increases similarly to $N^{-1/2}$. Fama (1998) calls this a "bad model problem" and argues that although it is less serious in event studies that focus on short return windows (e.g. a few days), since the daily expected returns are close to zero and hence have little effect on the estimates of unexpected (abnormal) returns, it is more severe in longer return horizons. Bad model problems are most acute with long term buy-and-hold abnormal returns (BHARs), which compound (multiply) the problems of an expected-return model in explaining short term returns. This is the reason that a bad model problem that produces a spurious abnormal return of X% per month becomes more reliable in the case of CAR. Mitchell and Stafford (2000) pointed out that even if there is no abnormal return after the first period, the BHAR measure can grow with the return horizon. For instance, if I suppose that returns for the first year after going public are 10% for IPO firms and zero for the benchmarks, the 1-year abnormal return for IPOs is thus 10%. If the event and benchmark firms both have a 100% buy-and-hold return over the next 4 years, the BHAR after 1 year increases to 20% (i.e. (1.1 x 2.0) – (1.0 x 2.0)).

the 'Tom Yum Kung Crisis'. The period between 1997 and 1999 was characterized by low trading volume and there were no IPOs issued in the Thai stock market during that time. In addition, their studies omitted some important risk factors, such as liquidity and momentum, and this omission may have affected their results about the Thai IPOs performance. Previous researcherss investigating Thai IPOs made no adjustment for size effects either and also applied only the main stock market (SET) index as a benchmark. Moreover, the studies which used only the SET market index may not have captured well the expected returns on small-size and medium-size stocks.

This study addressed all these issues in the research analysis and, in contrast to the existing previous studies, the IPOs performance in Thailand in the long-run were investigated using a wide range of alternative benchmarks (CAPM, FF and SD models) and models which had been designed to adjust for size effects. Moreover, this study examined the cross-sectional average of the calendar[14] regression results of the long-run returns as a further robustness check. In addition, this IPO study provided qualitative analysis by investigating the cases of individual IPO companies which, for example, were characterized by unusually high returns, through explaining the circumstances related to their business activity etc. (very little research in this area has even attempted to do that and to engage in detailed analysis of this kind), or by investigating the behaviour of IPOs during the key political events throughout the sample period in this study (the military coup in 2006 in Thailand), in order to provide a better explanation and understanding of the results. Table 2.1 summarises the recent empirical studies of long-run IPO performance in different countries, including Thailand, since 1996. The general weight of evidence shows negative long-run performance across several markets internationally. However, there are also some instances of long-run over-performance, notably in Germany, Malaysia and Thailand. It can be seen that the empirical results appear to be sensitive to the methods used to measure long-run stock price performance. In particular, the approach and weighted return used for the evaluation of abnormal returns in the long horizon period.

[14] Generally, long-term IPO performance analysis in the existing literature relies on the use of either event-time or calendar-time approaches. An event-time approach is applied when performance is measured relative to the date of the IPO, whereas a calendar-time approach is used when the returns are obtained for each calendar month and for each sample company that had an IPO event in the post-event period of interest. The portfolios of the IPOs are re-formed every month and then the portfolio returns are evaluated. The calendar-time approach is applied in this study in order to address contemporaneous cross-correlation, which may be a concern given some political and global macro shocks in Thailand (e.g. the coup in 2006 and also the Global Financial Crisis in 2007) affecting all IPO stocks in the market at certain points in time during the sample period.

Table 2.1 A summary of recent published empirical works on the long-run of IPO performance using event-time and calendar-time approaches

Author	Sample size	Country	Sample period	Approach	Portfolio[a] of IPOs	Benchmark	Long-run IPO performance measure[b]	Sign[c] (+/-)
Ritter (1991)	1,526 IPOs	United States	1975-1984	Event-time	EW VW	Market-index, Industry and size-matched company	CAR BHAR WR	(-)*
Loughran and Ritter (1995)	4,753 IPOs	United States	1970-1990	Event-time Calendar-time	EW VW	Market-index Sized-match company Size and book-to-market portfolio	BHAR WR FF model	(-)*
Lee *et al*. (1996)	266 IPOs	Australia	1976-1989	Event-time	EW	Market index	BHAR	(-)*
Ljungqvist (1997)	145 IPOs	Germany	1970-1990	Event-time	EW	Market index	BHAR	(-)*
Allen *et al.* (1999)	151 IPOs	Thailand	1985-1992	Event-time	EW VW	Market index	CAR	(+)
Chen *et al*. (2000)	342 IPOs	China	1992-1995	Event-time	EW	Market index	BHAR WR	(-)*
Espenlaub *et al*.(2000)	588 IPOs	United Kingdom	1985-1992	Event-time Calendar-time	EW VW	Market-index Sized-match company Size, Size and book-to-market portfolio	CAR CAPM, FF, SD, and RAT models	(-) and (-)*
Jakobsen and Sørensen (2001)	76 IPOs	Denmark	1984-1992	Event-time	EW	Market index, Size-matched company	CAR BHAR	(-)*
Jelic *et. al*. (2001)	182 IPOs	Malaysia	1980-1995	Event-time	EW	Market index	CAR BHAR WR	(+)*
Durukan (2002)	173 IPOs	Turkey	1990-1997	Event-time	EW	Market-index	BHAR	(+)
Kooli and Suret (2004)	445 IPOs	Canada	1991-1999	Event-time	EW	Size-matched company	CAR BHAR	(-)
Alvarez and Gonzalez (2005)	34 IPOs	Spain	1987-1997	Event-time	EW	Market-index, Size portfolio, Book-to-market ratio, Size and book-to-market ratio	BHAR	(-)

Table 2.1 (continued) A summary of recent published empirical works on the long-run of IPO performance using event-time and calendar-time approaches

Author	Sample size	Country	Sample period	Approach	Portfolio[a] of IPOs	Benchmark	Long-run IPO performance measure[b]	Sign[c] (+/-)
Akhigbe *et al*. (2006)	2,483 IPOs	United States	1990-2000	Event-time	EW	Market-index, Industry indices	BHAR	(-)*
Ahmad-Zaluki *et al*. (2007)	454 IPOs	Malaysia	1990-2000	Event-time Calendar-time	EW VW	Market-index, Size-matched company	CAR BHAR WR and FF models	(-)* and (+)*
Bessler and Thies (2007)	218 IPOs	Germany	1977-1995	Event-time	EW	Market-index, Size-matched company	BHAR	(-)* and (+)*
Burrowes and Jones (2007)	271 IPOs	United Kingdom	1995-1997	Event-time	EW	Market-index	CAR	(-)*
Goergen *et. al*. (2007)	252 IPOs	United Kingdom	1991-1995	Event-time Calendar-time	EW	Market-index, Size-matched company	CAR BHAR and FF model	(-)*
Kirkulak (2008)	433 IPOs	Japan	1998-2001	Event-time	EW	Market index	CAR BHAR	(-)*
Chorruk and Worthington (2010)	136 IPOs	Thailand	1997-2008	Event-time	EW	Market index	CAR BHAR WR	(-)*
Su and Bangassa (2011)	590 IPOs	China	2001-2008	Event-time Calendar-time	EW	Market-index, Size-matched company	CAR BHAR, FF and CARH models	(-)*
Thomadakis *et al*.(2012)	254 IPOs	Greece	1994-2002	Event-time	EW	Market-index	CAR BHAR	(-)*
Wen and Cao (2013)	121 IPOs	Taiwan	2005-2007	Event-time	EW	Market-Index	BHAR	(-)*
Agathee *et al*. (2014)	44 IPOs	Mauritius	1989-2010	Event-time Calendar-time	EW VW	Market-Index Size-matched company	CAR BHAR WR and FF model	(-)*

Note:

[a] There are 2 types of portfolio constructions, namely, an Equally-Weighted portfolio of IPOs (EW) and a Value-Weighted portfolio of IPOs (VW).

[b] The main stock market performance measures include CAR (Cumulative Abnormal Return), BHAR (Buy-and-Hold Abnormal Return), WR (Wealth Relative), CAPM (Capital Asset Pricing Model), FF (Fama-French (1993)Three Factor Model), CARH (Carhart (1997) Four Factor Model).

[c] (+) indicates a positive abnormal return of IPOs in the long-run (over-performance) and (-) indicates a negative return of IPOs in the long-run (underperformance). * defines a statistical significance.

2.3 Data sources and sample selection

The sample adopted in this study includes all 227 IPO stocks on the Thai stock market during the period from January 1, 2001 to April 4, 2012. This period was selected because January 2001, seemed to be a start-up period after the financial crisis of 1997 and was also when the annual volume of IPO issues began to increase. In the years before the study period, from 1997 to 1999, there were no IPOs issued at all. In order to avoid a sample selection bias, the sample also includes IPOs that were delisted before their three-year anniversary. Information and the number of the IPOs issued is from the official prospectus filing form (Form 69-1), available on the IPO filing database provided by the Securities and Exchange Commission (SEC), Thailand. The information concerning IPO companies listed on the SET and MAI during the period 2001 to 2012 was obtained from several sources. In general, the listed companies are obliged to publish a prospectus detailing to all investors their company profiles including the history of the company, the organization's structure, the offer size, the proportion of shareholders, 5-year financial statements, the risks involved with their operations and so on. I also have prospectuses for all sample IPOs, which are available on the SEC, the Thai electronic database. The data are available on the SEC website at http://sec.or.th. Additional information on IPOs was obtained from the SET website located at http://set.or.th. Further data were obtained from another secondary source, the SET SMART located at http://www.setsmart.com.

2.3.1 Sample selection

This section discusses the data collection by describing the criteria used to select the IPO companies and their benchmarks. In the initial step, lists of companies were collected, companies that had issued an IPO and had been listed on the SET and MAI during the period 2001 to 2012. The lists of IPO companies were obtained from the prospectus files on the SEC (Thailand) database. These were then verified with the SET database in the 'New Listed Company Information' section in order to confirm that the IPOs had subsequently been trading on the exchange.

The author collected all IPOs that had gone public since 2001 in Thailand. However, IPO companies had to satisfy the following criteria in order to be included in the final sample: (i) an offer price of Baht 1.00 per share or more; (ii) an offering involving equity only;

(iii) the company had to be listed on the SET (the main market) or MAI (small- and medium-sized market); (iv) the availability of price data on the Datastream database; and finally (v) the exclusion of companies classified as companies from Trust, Closed-End Fund or Exchange Traded Fund (ETF) sectors. The companies that are listed under the Trust, Closed-End Fund or Exchange Traded Funds sectors are excluded in this study because the data were not comparable with those of public listed companies. They also have different statutory requirements for preparing annual company reports.

The lists of companies are then cross-checked with the listing statistics available at http://www.set.or.th/en/company/ipo/upcoming_ipo_set.html on 14 May, 2014. When collecting the data for individual companies, the possibility of a change in a company's name is first checked. This is necessary as several companies had changed their name a number of times and the previous names did not appear on the Datastream database. In addition to this, the company classification according to eight sectors[15] occurs on the SET website so that IPOs can be matched with their industry benchmarks to show IPO performance.

2.3.2 Individual IPO company stock returns

The stock price data for individual IPO companies are collected from the Datastream database. In particular, the data comprised each IPO's closing price on the first day of trading and the 36 monthly stock returns following going public[16]. The monthly stock returns for each IPO were compared with monthly returns of stock market indices such as the SET and MAI indices and also additional alternative benchmarks, namely, CAPM, Fama and French's Three Factors Model and Size-Decile Model on a rolling basis for each of the 36 months after the initial listing.

[15] To examine industry differences, the sample was categorised into eight sectors, based on the Stock Exchange of Thailand (SET) sector classification. I also employed these 8 industry indices as an alternative benchmark. However, these indices had been calculated by the SET since 2004. Therefore, the data for analysing the performance of IPOs according to the industry benchmark comprised 133 IPOs going public from January 2004.

[16] It 'shows a theoretical growth in value of a shareholding over a specified period, assuming that dividends are re-invested to purchase additional units of an equity at the closing price applicable on the ex-dividend date. Gross dividends are used where available and the calculation ignores tax and re-investment charges. Adjusted closing prices are used throughout to determine price index and hence return index' (Datastream database definition).

2.3.3 Market returns

The closing day stock market (SET and MAI) indices[17] were also collected from the Datastream database in order to calculate the monthly market returns as market benchmarks[18]. To analyze IPO performance after listing on the Thai stock market, the SET index[19] (the main stock market index in Thailand) and the MAI index (small- and medium-sized markets) were incorporated into the event-study methodology. The IPO samples in this study were listed on two boards, with a benchmark appropriate to each board being used. The SET index was applied to provide a benchmark for IPO companies listed on the Main Board of the Stock Exchange of Thailand. Meanwhile, the Second Board Index was adopted for companies listed on the Market for Alternative Investment (the sub-market). The MAI index comprises all stocks quoted on the small- and medium-sized market. Both the SET and MAI indices are weighted by market capitalisation. As of 12 May 2014, there were 495 and 97 companies listed on the SET and MAI, respectively. The returns of IPOs forming the Main (Sub) Board are adjusted to the SET (MAI) index returns.

2.4 Methods

Existing empirical studies employ several different methods to investigate the long-run behaviour of IPOs. Generally, either raw returns or abnormal returns (measuring price dynamics relative to some benchmark) are used to assess the long-run performance. The studies of Ritter (1991), Carter *et al*. (1998), Jelic *et al*. (2001), Durukan (2002), Ritter and Welch (2002), Burrowes (2004), Álvarez and González (2005), Su and Bangassa (2011) employed cumulative average returns (CAR), buy-and-hold returns (BHAR) and wealth relatives (WR). In this study the author follows this event-time approach by exploiting all three abnormal return measures: CAR, BHAR and WR in order to investigate the performance of Thai IPO in the long run.

[17] The SET index is a market capitalization-weight price index, calculated from the prices of all common stocks including unit trust and property funds on the main board. Excluded are stocks that have been suspended from trade for more than one year. The MAI index is a market capitalization-weighted index, relying on the same calculation methodology as that of the SET Index. It is calculated from the prices of all common stocks listed on the MAI.

[18] "Benchmark selection can have an important impact on the magnitude of abnormal returns for event studies" (Espenlaub *et al*., 2000). It is therefore difficult for event-study research to choose an appropriate benchmark. In order to alleviate this problem, I compare abnormal returns in relation to a number of alternative benchmarks.

[19] For the SET index, it was calculated from the 100 largest stocks, weighted by market capitalization.

This study also selected the appropriate market indices as benchmarks for each IPO firm depending on their stock exchange listing and the size of the IPO firms. The returns of the IPOs were analysed in horizons up to 36 months after the first day of trading. This was done in order to be able to make comparisons with findings presented in previous studies, which typically followed Ritter(1991) and other studiess which adopted similar methodology.

2.4.1 Cumulative Abnormal Return (CAR)

The market-adjusted abnormal returns of company *i* in event month *t* ($AR_{i,t}$) are calculated for each event month *t* as follows:

$$AR_{i,t} = R_{i,t} - R_{m,t} \tag{2.1}$$

where $R_{i,t}$ is the monthly raw return of the company *i* in event month *t*, excluding the initial return.

Thus, $R_{i,t} = (P_{i,t}-P_{i,t-1})/P_{i,t-1}$ where $P_{i,t}$ is the last traded price of the company in event month *t* and $P_{i,t-1}$ is the last traded price of the company in event month *t*-1. $R_{m,t}$ is the return on the market index (SET or MAI indices) in event month *t* and is calculated as $R_{m,t} = (P_{m,t}-P_{m,t-1})/ P_{m,t-1}$ where $P_{m,t}$ is the last closed stock market index in event month *t* and $P_{m,t-1}$ is the last closed market index in event month *t*-1.

The average market-adjusted return for a sample of *n* companies in event month *t* is defined as follows:

$$\overline{AR}_{i,t} = \frac{1}{n}\sum_{i=1}^{n} AR_{i,t} \tag{2.2}$$

In the case of the value-weighted arithmetic mean of the market-adjusted return, the formula is computed as:

$$\overline{AR}_{i,t} = \sum_{i=1}^{n} \omega_i AR_{i,t} \tag{2.3}$$

where ω_i is the weight of market value and is also calculated by $MV_i/\Sigma_i MV_i$, where MV_i is the market value of IPO firms on the first day of trading and $AR_{i,t}$ is the market-adjusted return. The cumulative average abnormal return of company *i* from event month 1 to event month *T* is defined as follows:

$$\overline{CAR}_{i,t} = \sum_{i=1}^{T} \overline{AR}_{i,t} \tag{2.4}$$

In (2.1), (2.2), (2.3) and (2.4) this study uses the assumption that the event windows of the *N* securities do not overlap to set the covariance terms to zero. Inferences about the cumulative abnormal returns can be drawn using

$$\overline{CAR}(1,T) \sim N(0, \sigma^2(1,T)) \tag{2.5}$$

To estimate whether the cumulative market-adjusted returns are significantly different from 0, a conventional *t*-statistic is considered and calculated as follows:

$$CAR_{t,month} = \frac{\overline{CAR}_{i,t}}{\sigma(CAR_{i,t})/\sqrt{n}} \tag{2.6}$$

where σ is the standard deviation of the abnormal return in the sample and *n* is the number of IPOs.

Previous studies have reported that abnormal return distributions show fat tails and are right skewed. Parametric tests such as the student *t*-test and the conventional *t*-test are not well specified. Non-parametric tests have proven to be useful in testing for event effects due to well-documented (theoretical) robustness results in the statistical literature (e.g., see Álvarez and González, 2005; Akhigbe *et al*., 2006) and to be more powerful at

detecting a false null hypothesis of no abnormal returns. Then, this study employs the non-parametic Wilcoxon signed-ranks test to test the null hypothesis that the median abnormal return is zero. This test considers that both the sign and the magnitude of abnormal returns are important. The statistic is given by: $S_N = \sum r_i^+$, where r_i^+ is the positive rank of the absolute value of abnormal returns. It is assumed that none of the absolute values are equal, and that each is different from zero. The sum is over the values of abnormal returns greater than zero. When N is large, the distribution of S_N, under the null hypothesis of equally likely positive or negative abnormal returns, will be approximately a normal distribution with: $E(S_N) = N(N + 1)/4$ and then $\sigma^2(S_N) = N(N + 1)(2N + 1)/24$.

2.4.2 Buy-and-Hold Abnormal Return (BHAR)

The abnormal return of company i in event month t are $BHAR_{i,t}$.

$$BHAR_{i,t} = \left[\prod_{t=1}^{T}(1+R_{i,t})-1\right] - \left[\prod_{t=1}^{T}(1+R_{m,t})-1\right] \tag{2.7}$$

where $R_{i,t}$ and $R_{m,t}$ are the monthly return on the stock i and the market index in event month t respectively. The mean buy-and-hold returns are calculated as:

$$\overline{BHAR}_{i,t} = \sum_{i=1}^{n} \omega_i BHAR_{i,t} \tag{2.8}$$

When equally-weighted (EW) is considered, $\omega_i = 1/n$, and when value-weighted (VW) is employed, $\omega_i = MV_i/\sum_i MV_i$, where MV_i is the IPO firm's stock market value on the first trading day. Therefore, the identification of IPO outperformance (underperformance) is a positive (negative) value of $BHAR_{i,t}$. In order to test whether the average buy-and-hold return is significantly different from 0 or not, a conventional t-statistic is calculated as:

$$BHAR_{t,month} = \frac{\overline{BHAR}_{i,t}}{\sigma(BHAR_{i,t})/\sqrt{n}} \tag{2.9}$$

Many researchers document that long buy-and-hold abnormal returns are positively skewed or have a positive skewness bias (Lyon *et al*., 1999; Ahmad-Zaluki *et al*., 2007; Goergen *et al*., 2007; Su and Bangassa, 2011; and also others). As a result, this leads to the standard *t*-statistics being negatively biased.

Beginning with Fama *et al*. (1969), CARs provide a common approach to investigate long-run returns. Fama (1998) additionally proposed a bad-model problem using long-term buy-and-hold abnormal returns (BHARs), which compound an expected-return model's problems in explaining returns in the short-run. He also suggested that CARs should be used rather than BHARs. In order to eliminate the skewness bias and to test that the cumulative abnormal return and buy-and-hold abnormal returns are significantly different from 0, a bootstrapped skewness-adjusted *t*-statistics, as developed by Johnson (1978), were also applied as follows:

$$t_{sa} = \sqrt{n}\left(S + \frac{1}{3}\hat{\gamma}S^2 + \frac{1}{6n}\hat{\gamma} \right) \tag{2.10}$$

where

$$S = \frac{\overline{BHAR}}{\sigma(BHAR_t)} \quad and \quad \hat{\gamma} = \frac{\sum_{i=1}^{n}(BHAR_{i,t} - \overline{BHAR_t})^3}{n\sigma(BHAR_t)^3}$$

2.4.3 Wealth Relatives (WR)

The relative long-run performance of IPOs is measured by the Wealth Relative ratio (WR) as calculated by Ritter (1991). Thus,

$$WR_t = \frac{\frac{1}{n}\sum_{i=1}^{n}\left(\prod_{t=1}^{T}(1 + R_{i,t}) \right)}{\frac{1}{n}\sum_{i=1}^{n}\left(\prod_{t=1}^{T}(1 + R_{m,t}) \right)} \tag{2.11}$$

where WR_t is the wealth relative ratio for the period between $t = 1$ and $t = T$. $R_{i,t}$ is the market return of firm i in month t, $R_{m,t}$ is the return on the stock index and n is the number of IPOs.

In the case of Wealth Relatives being larger (smaller) than 1, it indicates that the IPO firm's performance is superior (inferior) to the performance of the benchmark. This study used two benchmarks in this study: the SET and MAI Indices.

In general, either raw (absolute) performance or performance relative to a benchmark (abnormal returns) is employed to measure long-run performance (Ritter and Welch, 2002). However, raw returns are usually not the best measure to determine whether the performance of an IPO was appropriate in respect to risk and return (Bessler and Thies, 2007). To analyze the performance of IPOs in the long-run after listing the raw returns with various benchmarks were adjusted and event-study methodology was also employed. Monthly abnormal returns are calculated for up to 36 months after going public. This study followed Espenlaub, Gregory and Tonks (2000) who re-examined the long-term underperformance of UK IPOs. To calculate the abnormal return, this study applied three alternative benchmarks as follows:

2.4.4 Capital Asset Pricing Model (CAPM)

CAPM was developed by Shaper (1964), Lintner (1965) and Mossin (1966). In general, the CAPM shows how there can be a relationship between the average return of stock and market risk factors. However, it makes many assumptions. To calculate the abnormal return with respect to CAPM benchmark or *CAAR*, the formula is computed as:

$$CAAR_{it} = R_{it} - \left[R_{ft} + \hat{\beta}_i\left(R_{mt} - R_{ft}\right)\right] \tag{2.12}$$

where R_{it} is the return on the IPO company i in event month t, R_{mt} is the return on the market in event month t as measured by the return on the SET index, R_{ft} is the one-month treasury bill rate in event month t, and β_i is the CAPM beta of company i, estimated by Ordinary Least Square (OLS) regression up to 36 months after the IPO.

2.4.5 Fama and French Three-Factor Model (FF)

The Fama and French (1993) three-factor model is used to control for event clustering and cross-correlation in IPO returns. Fama and French (1993) suggested using this model to describe the cross-section of expected returns rather than using Capital Asset Pricing Model (CAPM). Banz (1981) also implies that the CAPM does not describe expected returns on small stocks. Therefore, the three Fama-French factors are employed in this event study and are regressed on excess returns of IPO portfolios. The abnormal return with respect to the Fama and French three-factor model benchmark or *FAAR*, the formula is computed as:

$$FAAR_{it}^{ff} = R_{it} - \left[R_{ft} + \hat{\beta}_i^{ff}(R_{mt} - R_{ft}) + \hat{\gamma}_i^{ff}(SMB_t) + \hat{\delta}_i^{ff}(HML_t)\right] \quad (2.13)$$

where R_{it} is the monthly return on the IPO firm in event month *t*, R_{ft} is the one-month Treasury bill rate in event month *t*, R_{mt} is the monthly return on a value-weight market portfolio of SET in event month *t*, SMB_t is the difference between the returns on portfolios of small and big stocks or the value-weighted return on small companies minus the value-weighted return on big companies in event month *t*, and HML_t is the difference between the returns on portfolios of high- and low book-to market-value or the value-weighted return on high book-to-market value companies minus the value-weighted return on low book-to-market value companies in event month *t*.

Following Fama and French (1993) portfolios were constructed that mimic the size and value factors in the Thai stock market. Thai IPO firms in this study were categorised into 6 groups: BH, BM, BL, SH, SM, and SL. This study omitted common stocks, which are in financial sector from the FF three-factor and Carhart four-factor construction[20]. Firstly, the median size value or market capitalisation was then used to divide the stocks into two groups; small (S) and big (B). Secondly, the stocks were also divided into three book-to-

[20] The finance literature in general excludes financial and insurance companies and banks from cross-sectional asset pricing tests (e.g., Brennan et al., 1998; Fama and French, 2008). The reason for excluding financial firms is their high leverage and their accounting treatment of revenues and profits which is significantly different than that in other sectors (Opler and Titman, 1994). In addition, Fama and French (2000) emphasise the regulated nature of financial firms. The main prediction of an asset pricing model, though, is that the expected return on any risky asset is linear in beta. Thus, the cross-sectional difference between the mean return of assets is entirely predicted by their beta exposure. Since asset pricing models ought to capture cross-sectional discrepancies across all assets, it is an economically relevant question whether these models are able to price also financial stocks.

market equity groups, based on the bottom 30% (low, L), middle 40% (medium, M), and top 30% (high, H) of the ranked values of the book-to-market ratio. Finally, the stocks were organised into six groups with regard to cross of securities group is BH, BM, BL, SH, SM, and SL.

According to Fama and French (1996), the SMB and HML portfolios are organised by considering each event month *t* and sorting all IPO firms by market capitalisation and book-to-market value. Thus,

SMB_t (Small minus Big) is calculated as follows:

SMB_t = Average Returns of Small Size minus Big Size

= (SL + SM +SH) /3 – (BL + BM + BH) /3

and HML_t (High minus Low) is calculated as follows:

HML_t = Average Returns of High BE/ME ratio minus Low BE/ME ratio

= (SH + BH) /2 – (SL + BL) /2

2.4.6 Size Control Portfolio (SD)

Size effects have been applied to studies of IPO performances in different ways. For example, Espenlaub *et al.* (2000) used market capitalization to categorise 10 size control portfolios. Therefore, to calculate the abnormal return, the third model is a simple size adjustment where the benchmark is the average return on the relevant size-decile portfolio, as in the following:

$$SDAR_{it}^{ss} = R_{it} - R_{st} \tag{2.14}$$

where $SDAR_{it}$ is the abnormal return by using SD, and R_{st} is the return on the size control portfolio in event month *t*. In this model, the control portfolio returns are equally-weighted average returns on six portfolios: BH, BM, BL, SH, SM, and SL derived from the Fama and French three-factor model.

The abnormal returns which are relative to each of the three benchmarks, are cumulated over time up to period T after listing. The author calls this the Cumulative Abnormal Return (CAR). Therefore,

$$CAR_T = \sum_{t=+1}^{T} \omega_i \sum_t AR_{it} \tag{2.15}$$

where AR_{it} is the abnormal return form firm *i* in month *t*. When an equally-weighted portfolio of IPOs (EW) is considered, $\omega_i = 1/n$, and when value-weighted returns (VW) are employed, $\omega_i = MV_i/\sum_i MV_i$, where MV_i is the IPO firm's stock market value on the first trading day.

To assess the statistical significance of CAPM, Fama and French and SD abnormal return, the author applies *t*-statistics based on Brown and Warner's (1980) Crude Dependence Adjustment Test in order to correct for cross-sectional dependence:

$$t - stat = \frac{CAR_t}{\sqrt{t * \left[\sum_{t=1}^{T} (\overline{AR}_{pt} - (CAR_{36}/36))^2\right]/(35)}} \tag{2.16}$$

where

$$\overline{AR}_{pt} = \frac{1}{n}\sum_i AR_{it}$$

CAR_t is the cumulative average abnormal return till month *t*, and CAR_{36} is the cumulative average abnormal return for the 36 months after going public.

2.4.7 Calendar-time Approach

Fama (1998) suggested that the event-time approach overstates the statistical inferences once it no longer controls for correlation among individual firms. Therefore, as a

robustness check of the results, the calendar-time portfolio approach using Fama and French's (1993) three-factors was used to eliminate the potential problems of cross-sectional correlations among Thai stocks in the event-time approach and also to obtain more robust *t*-statistics. First, the average monthly abnormal returns on a diversified portfolio composed of firms going public within the last 36 months in each calendar month between January 2003 and May 2012 were calculated. Second, Fama and French's (1993) three factors were estimated to test the significance in the pattern of long-term returns. If IPOs overperform on a risk-adjusted basis, a portfolio of IPOs should consistently overperform relative to the FF model.

The monthly excess returns on equally-weighted and value-weighted portfolios of IPOs were regressed on the market premium, the size premium, and the value premium using the following model:

$$R_{pt} - R_{ft} = \beta_0 + \beta_1(R_{mt} - R_{ft}) + \beta_2 \mathrm{SMB}_t + \beta_3 \mathrm{HML}_t + \mathcal{E}_t \quad (2.17)$$

where R_{pt} is the return of the IPO portfolio in month *t*, R_{ft} is the one-month Thai T-Bill rate, observed at the beginning of month *t*, R_{mt} is the value-weighted return on the market index in month *t*, SMB_t (small minus big) is the monthly return on the zero investment portfolio for the size factor in the stock returns or the difference between the equally-weighted average of the returns on a portfolio of small stocks and a portfolio of big stocks, and HML_t (high minus low) is the monthly return on the zero investment portfolio for the book-to-market equity factor in stock returns, or the difference between the return on a portfolio of high book-to-market ratio stocks and a portfolio of low book-to-market ratio stocks, constructed independently from the size portfolio.

Furthermore, in this study an additional variant of the market model was applied with the inclusion of the liquidity factor. The definition of the liquidity factor (LIQ_t) follows Amihud (2002) and the author calculated it as: $\frac{1}{Day_{i,t}} \sum_{d=1}^{Day_{i,t}} \frac{|R_{i,t}|}{V_{i,t}}$ where $R_{i,t}$ is the return on day *d* in month *t*, $V_{i,t}$ is the Baht volume of trade (in thousands) on day *d* in month *t* and $Days_{i,t}$ is the number of trading days in month *t* for stock *i*.

In addition, a momentum factor was added to the Fama-French model. This study constructed the momentum factor (MOM_t) following Carhart (1997), where MOM_t is the average return on the two high prior return portfolios (past winner stocks) minus the average return on the two low prior return portfolios (past loser stocks). This study used value-weighted portfolios formed on size and one year-lag returns to construct the MOM_t variable. The portfolios, which were constructed monthly, were formed on size (small and big) and sorted by one year-lag *CAR* returns (from low to high). The monthly size breakpoint was the median market value. The return breakpoints were the 30th and 70th percentiles.

The MOM_t variable was therefore defined as: *MOM* = ½ (Small High + Big High) – ½ (Small Low + Big Low). The portfolios including all Thai stocks (but excluding financial stocks) were reformed monthly. Finally, I estimated the LCAPM model with the liquidity factor:

$$R_{pt} - R_{ft} = \beta_0 + \beta_1(R_{mt} - R_{ft}) + \beta_2 \mathrm{LIQ}_t + \mathcal{E}_t \qquad (2.18)$$

and the Carhart (1997) four-factor model:

$$R_{pt} - R_{ft} = \beta_0 + \beta_1(R_{mt} - R_{ft}) + \beta_2 \mathrm{SMB}_t + \beta_3 \mathrm{HML}_t + \beta_4 \mathrm{MOM}_t + \mathcal{E}_t \qquad (2.19)$$

where MOM_t is the monthly return on a zero-investment portfolio for the momentum factor constructed as the difference in returns between a portfolio of past winner stocks and a portfolio of past loser stocks defined as described above. Other variables were defined in the same way as in the model in equation (2.17).

The calendar-time approach method weights each month equally. This leads to the reduction of any underperformance when it is correlated with the number of IPOs in the portfolios (Gompers and Lerner, 2003). As a result, the intercepts, the estimates of which are based on the Weighted Least Squares (WLS) method, weighted by the square root of the number of IPOs in the IPO portfolios in each calendar month provide a test of the null hypothesis that the mean monthly abnormal return on the calendar-time portfolio is zero.

2.5 Empirical findings

The previous section defined the appropriate research methodology and method, including the sample collection and the index creation for the study. In this section the data results and statistics analysis will be presented.

The Thai IPO sample in this empirical chapter consists of 227 common stocks issued between 2001 and 2012 in Thailand's stock markets. Table 2.2 shows the main characteristics of the data divided according to the IPO year across the whole sample and split into the SET and MAI subsamples. Approximately 65% of the IPO listings were made on the SET market and 35% on the MAI market. Although the sample size in this study is larger and more up-to-date than in the previous Thai IPO studies,such as 150 IPOs for Allen et al. (1999) and 136 IPOs for Chorruk and Worthington (2010), the number of new issues in Thailand is still less when compared to IPO activities in Asian countries such as China, Hong Kong, Japan, Korea, Malaysia and Singapore (see Moshirian and Wu, 2010[21]).

As in Chorruk and Worthington (2010) and Boonchuaymetta and Chuanrommanee (2013), nearly all of the firms in the sample issued their IPOs in 2004 and 2005. Interestingly, after 2006 there was a lower number of Thai IPO issues than in the previous period. A probable reason for this lower IPO activity is that there was a military coup and various political conflicts in Thailand at that time. However, the proportion of the IPOs issued in the MAI increased markedly compared to those in the SET market. This seems to be consistent with the flexibility of the MAI market's listing regulations as mentioned in Chapter 1. Most of the IPO firms in Thailand belong to the Property & Construction industry (22.47%). The majority of IPOs in the MAI sample are from the Services industry (28.75%). Further analysis of industries reveals that in the SET market, 16.33% of the sample comes from the Services sector, 14.29% from the Financial sector, 13.60% from the Technology sector, and 12.93% from the Industrial sector and the remaining industries have less than a 10% representation. In the MAI market, 25% of the sample belongs to the Industrial sector, 13.75% to the Property & Construction industry, 12.50%

[21] Moshirian and Wu (2010) reported the number of 982 IPOs (China), 563 IPOs (Hong Kong), 1,392 IPOs (Japan), 410 IPOs (Korea), 708 IPOs (Malaysia), and 384 IPOs (Singapore) going public between 1991and 2004.

to the Consumer Products industry, and 10% to the Technology industry and the remaining industries have equal or less than a 5% representation.

Table 2.2 Sample size of Thai IPOs

Panel A: sample size disaggregated by exchange and by IPO offering year						
Year	**Stock Exchange of Thailand (SET)**		**Market for Alternative Investment (MAI)**		**Total**	
	Number	**%**	**Number**	**%**	**Number**	**%**
2001	6	4.08	3	3.75	9	3.96
2002	19	12.93	2	2.50	21	9.25
2003	21	14.29	6	7.50	27	11.89
2004	36	24.49	13	16.25	49	21.59
2005	31	21.09	14	17.50	45	19.82
2006	9	6.12	6	7.50	15	6.61
2007	5	3.40	7	8.75	12	5.29
2008	8	5.44	3	3.75	11	4.85
2009	5	3.40	11	13.75	16	7.05
2010	4	2.72	7	8.75	11	4.85
2011	3	2.04	7	8.75	10	4.40
2012	0	0	1	1.25	1	0.44
Total	147	100.00	80	100.00	227	100.00
Panel B: sample size disaggregated by exchange and by industry group						
Industry	**Stock Exchange of Thailand (SET)**		**Market for Alternative Investment (MAI)**		**Total**	
	Number	**%**	**Number**	**%**	**Number**	**%**
Agro & Food	6	4.08	2	2.50	8	3.52
Consumer Products	3	2.04	10	12.50	13	5.73
Financial	21	14.29	2	2.50	23	10.13
Industrial	19	12.93	20	25.00	39	17.18
Resources	14	9.52	4	5.00	18	7.94
Service	24	16.33	23	28.75	47	20.70
Technology	20	13.60	8	10.00	28	12.33
Property & Construction	40	27.21	11	13.75	51	22.47
Total	147	100.00	80	100.00	227	100.00

2.5.1 Long-run Performance Results in Equally-weighted and in Value-weighted Portfolios of IPOs

In this section the empirical results, including a robustness analysis, are presented and an extensive discussion of the findings is provided. Table 2.3 shows descriptive statistics for the excess returns of the Thai IPOs over the 36 month period after going public (See more Table 2A, Appendix 2A, Page 64). In relatively small samples, the abnormal return analysis may suffer from the problem that the excess returns are not normally distributed. Therefore, the Jarque-Bera test was employed to verify the null hypothesis about the normality of the distribution. The results show that the null hypothesis cannot be accepted. This means that the average market-adjusted returns (ARs) between months 1 and 36 are not normally distributed, which may cause statistical inference problems

(Brown and Warner, 1980). In order to control for a possible bias in the calculation of long-run abnormal returns using the CAR and BHAR measures, the author applied a bootstrapped skewness-adjusted *t*-statistic and a crude dependence adjustment test.

Table 2.3 Average market-adjusted returns for Thai IPOs listed from 2001 to 2012, relative to two market benchmarks: SET and MAI and normality test

$Month_t$	N_t	Average market-adjusted returns (AR_t) (%)							
		Mean	**Median**	**Maximum**	**Minimum**	**SD**	**Skewness**	**Kurtosis**	**Jarque-Bera**
1	227	-5.39	-8.57	106.59	-41.80	21.26	1.67	7.96	338.56***
2	227	0.33	-2.72	86.50	-28.00	15.56	0.22	10.73	746.92***
3	227	0.01	-1.23	64.34	-58.30	12.86	0.30	7.33	190.59***
4	225	2.78	-0.95	140.33	-24.68	18.21	3.81	24.52	4,888.70***
5	225	1.28	-0.30	49.31	-43.03	11.91	0.78	5.65	88.55***
6	224	0.58	-1.01	97.85	-67.89	14.73	1.50	13.96	1,204.00***
12	218	0.20	-0.51	49.91	-30.96	11.46	1.02	6.51	149.81***
24	209	-1.08	-2.69	79.20	-60.99	13.13	1.60	13.42	1,035.29***
36	197	0.08	-0.47	127.78	-30.15	13.33	4.71	45.48	15,538.43***

Note:

This table shows descriptive statistics of market-adjusted returns up to a 36-month period after listing or going public, excluding the initial return (IPO underpricing). The Jarque-Bera test results of null hypothesis show distributions that are normal.

***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Tables 2.4 and 2.5 present equally-weighted and value-weighted abnormal returns of the 227 IPO firms for up to 36 months after listing (See more in Tables 2B-2M, Appendix 2A, Pages 65-76). These were calculated using CAR, BHAR and WR measures. The average market-adjusted return at the end of the first month is -5.39% and it is statistically significant at 0.01 level. The statistical significance of the buy-and-hold market benchmark abnormal returns was tested by using conventional, bootstrapped skewness adjusted *t*-statistics and sign-rank tests. This test indicates that the equally-weighted buy-and hold abnormal returns (EWBHARs) of -5.39% (*t*-stat = -3.82), -4.62% (*t*-stat = -2.39) and -4.88% (*t*-stat = -2.43) are statistically significant in the entire sample in one-, two- and three-month periods, respectively. This means that the IPO underpricing or the high initial return of IPOs is adjusted instantaneously in the early aftermarket trading.[22] This finding is similar to the results of Lee *et al*. (1996) and Ahmad-Zaluki *et al*. (2007) which showed that there were negative returns in the first-month period after listing for the IPOs on the Australian and Malaysian stock markets, respectively. Yet they are in contrast to the findings of Chorruk and Worthington (2010), which show positive CARs for the Thai

[22] Consistent with the results of Allen *et al*. (1999), the equally-weighted market-adjusted return at the end of the listing month for 151 IPOs, launched on the SET market during the 1985-1992 period, was -2.9%.

IPOs (15.42%) in the first month after entering the secondary market. The reason why a one-month CAR was still positive could perhaps be that Chorruk and Worthington (2010) included the initial return (the underpricing effect) when they calculated the abnormal return. The WRs, which are reported in Table 2.5, conform to the values of equally-weighted BHARs in this study. As can be seen in Table 2E (Appendix 2A, Page 67), all wealth relatives have a value of less than 1.00 between months 1 and 36, apart from months 12-14 (WR = 1.00). For the main Thai stock market, the results indicate that SET IPOs are underperforming between -5.29% (*t*-stat = -3.62) at month 1 and -19.63 (*t*-stat = 2.92) for the EWCARs and -16.58% (*t*-stat = -2.01) for the EWBHARs at month 36.

Negative abnormal returns at the end of year 3 were also obtained using the non-parametric Wilcoxon signed rank test and the bootstrapped adjusted *t*-test. This finding of underperformance is consistent with the results of Ritter (1991), Jakobsen and Sørensen (2001), Kooli and Suret (2004), Álvarez and González (2005), Almad-Zaluki *et al*. (2007), Goergen *et al*. (2007), Kirkulak (2008), Mazouz *et al*. (2008), Wen and Cao (2013) and Agathee *et al*. (2014) showing that the IPOs underperform relative to the benchmarks in the long-term. However, the underperformance using EWCAR and EWBHAR in this study is smaller than that reported by Chorruk and Worthington (2010), who found a three-year BHAR of -25.39% for the Thai IPOs. In addition, these findings demonstrate that for the small- and medium-size IPOs from the MAI market, the three-year EWCAR is 13.91% (*t*-stat = 1.20) and EWBHAR is 4.51% (*t*-stat = 0.33). The bootstrapped skewness-adjusted *t*-stats and the sign-rank stats show no statistical significance. The EWCAR figures for the entire SET and MAI samples from Panel A in Table 2.4 are plotted in Figure 2A (see Appendix 2B, Page 83). The CAR, as an equally-weighted measure, shows a poor abnormal performance throughout the whole long horizon period. It is also noticeable that the CAR for SET declines in performance over the three years after listing, whereas the CAR for MAI increases or outperforms above its benchmark after month 24. It can be seen from Figure 2A that both the market-adjusted CARs display similar patterns between the event months 1 and 13, after which period the CAR for SET drops instantaneously. However, the CAR pattern for the MAI sample moves just under the zero-return line (exhibiting underperformance) until the end of year 2, after which it rebounds from -4.12% in month 24 to 4.05% in month 25.

Figure 2B shows the long-run performance of the Thai IPOs by using equally-weighted BHAR over a 36-month horizon after going public (see Appendix 2B, Page 83). The

mean BHARs for both sub-samples are also negative until month 9, after which they become positive. Interestingly, at month 16 the mean BHAR for SET changes to a negative return; it is -16.58% and statistically significant at the end of year 3, while the IPO returns in MAI are still outperforming the benchmark during months 11 to 36 and the mean BHAR for the MAI sample is at 4.51% (*t*-stat = 0.33) in year 3 but is not significant. The BHAR of the SET market IPOs shows a similar pattern of increasing and decreasing values over the whole 36-month period following the IPO. In contrast to the BHAR for MAI, the abnormal return is negative during months 1 to 10, after which period it slightly fluctuates above the zero line until month 24. The small underperformance for MAI in year 2 does not continue in year 3.

In attempts to measure long-term performance, one can apply either an equally-weighted portfolio of IPOs or a value-weighted market portfolio to calculate cumulative and buy-and-hold abnormal returns. Fama (1998) argues that equally-weighted returns may produce different inferences from those derived from value-weighted returns. Therefore, in this study the author considers both equally-weighted and value-weighted portfolios, which provide an important robustness check for the findings.

Tables 2.4 and 2.5 in Panel B illustrate the investment results in a value-weighted portfolio of the Thai IPOs over a 36-month horizon. The results indicate that the three-year VWCAR and VWBHAR are 5.51% (*t*-stat = 1.18) and 26.34% (*t*-stat = 3.75), respectively, for the whole sample. This finding implies that if investors buy IPOs at the closing price on the first trading day and hold them for a three-year period, they can generate long-term abnormal returns if their investment result is measured by VWBHAR. Separation of the Thai IPOs into SET and MAI samples further reveals more detailed patterns. IPOs for the SET market comprise 147 companies while the MAI market sample contains only 80 IPO companies.

Again, Tables 2.4 and 2.5 document the market value-weighted cumulative and buy-and-hold abnormal returns over a 36-month period for the SET sample. The findings contrast with the long-term abnormal returns of IPOs based on an equally-weighted portfolio. It can also be seen that the IPO over-performance of SET in the long horizon is similar to the over-performance in the whole sample. This effect may be related to the size of the IPOs in the SET market. Tables 2.4 and 2.5 in Panel B report the VWCARs and VWBHARs of IPOs over 36 months after going public for the MAI sample. They show that slight

underperformance of IPOs occurred during months 1 to 3 and that it was followed afterwards only by a positive return not until the point at the end of year 3. The three-year abnormal return measured by VWCAR was 15.20% and significant (*t*-stat = 1.74) but when it was measured by VWBHAR it was 13.46% and not significant (*t*-stat = 1.24). The value-weighted returns for the entire SET and MAI samples are plotted in Figures 2C and 2D (see Appendix 2B, Page 83). The long-term IPO performance, measured using an equally-weighted portfolio, is different from the pattern when a market-weighted portfolio of IPOs is applied, especially for the MAI sample. It is noticeable that the lines representing VWCAR and VWBHAR for the whole sample and for the SET sample are nearly superimposed over the long horizon period. At the end of year 3, there was a positive abnormal return for both SET and MAI markets. However, the long-term abnormal return of the IPOs in the SET market is inferior to the return in MAI when considering VWCARs, and superior in the cases when VWBHARs are used. However, regardless of using equally-weighted or value-weighted returns, the results show a similar long-term IPO price pattern in the MAI market data. This means that the size has a greater effect on abnormal returns in the main market SET than in the lower-tier market MAI. This may be the case because the SET requires a paid-up capital of more than 300 million Baht from the listed companies but the MAI requires only between 20 and 300 million Baht. Therefore, there is a size limitation for the MAI firms but no upper restriction in the SET market. As a result, the market size of SET IPOs has a wider range than that of the MAI IPOs. Thus, when this study uses equally-weighted and value-weighted methods, such a wide variation is observed in long-term abnormal returns.

Table 2.4 Equally- and valued-weighted cumulative market-adjusted returns for Thai IPOs listed from 2001 to 2012

Panel A: Equally-Weighted Cumulative Abnormal Returns (EWCARs)

$Month_t$	Entire sample						SET sample						MAI sample					
	N_t	$\overline{CAR}_{i,t}$ (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR <0	N_t	$\overline{CAR}_{i,t}$ (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR <0	N_t	$\overline{CAR}_{i,t}$ (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR <0
1	227	-5.39	-3.92***	-2.26***	-5.53***	71.37	147	-5.29	-3.62***	-1.52	-4.09***	68.03	80	-5.57	-1.86*	-1.32	-3.64***	77.50
2	227	-5.06	-2.73***	-2.10***	-4.59***	69.16	147	-5.66	-2.87**	-1.87*	-3.33***	64.63	80	-3.95	-1.03	-0.86	-3.22***	77.50
3	227	-5.05	-2.55**	-2.03***	-3.84***	66.52	147	-5.30	-2.41**	-1.76*	-2.94***	64.63	80	-4.59	-1.17	-0.98	-2.46**	70.00
4	225	-2.27	-0.93	-0.87	-2.48**	60.00	147	-2.31	-0.80	-0.71	-1.94**	58.50	78	-2.35	-0.52	-0.45	-1.57	62.82
5	225	-0.99	-0.38	-0.37	-1.83*	60.89	147	-2.02	-0.67	-0.60	-1.65**	61.90	78	0.80	0.16	0.21	-0.88	58.97
6	224	-0.41	-0.15	-0.27	-1.77*	58.93	147	-1.52	-0.47	-0.42	-1.68**	59.86	77	0.56	0.12	0.17	-0.71	57.14
12	218	-0.78	-0.20	-0.23	-1.29	57.34	144	-0.14	-0.03	-0.01	-1.12	58.33	74	-2.58	-0.40	-0.35	-0.69	55.41
24	209	-12.80	-2.58**	-2.62**	-3.06***	59.33	141	-19.43	-3.16***	-2.76***	-3.16***	60.28	68	-4.12	-0.50	-0.45	-0.76	57.35
36	197	-4.86	-0.82	-1.49	-1.83*	53.57	136	-19.63	-2.92***	-2.60**	-2.69***	56.62	60	13.91	1.20	1.30	0.78	46.67

Panel B: Value-Weighted Cumulative Abnormal Returns (VWCARs)

$Month_t$	Entire sample						SET sample						MAI sample					
	N_t	$\overline{CAR}_{i,t}$ (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR <0	N_t	$\overline{CAR}_{i,t}$ (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR <0	N_t	$\overline{CAR}_{i,t}$ (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR <0
1	227	0.97	0.95	11.17***	-4.69***	71.36	147	1.28	1.05	13.09***	-3.38***	68.03	80	-5.60	-2.11**	-1.81*	-3.48***	77.50
2	227	1.45	1.00	7.15***	-4.23***	69.16	147	1.67	0.96	7.54***	-3.16***	64.63	80	-3.08	-0.82	-0.64	-3.09***	77.50
3	227	-0.94	-0.58	4.41***	-3.30***	66.52	147	-0.92	-0.47	4.35***	-2.52**	64.63	80	-1.36	-0.36	-0.31	-2.04**	70.00
4	225	-0.19	-0.10	3.92***	-2.37**	60.00	147	-0.26	-0.12	3.91***	-2.03**	58.50	78	1.41	0.34	0.32	-1.08	62.82
5	225	1.42	0.65	3.46***	-1.95*	60.88	147	1.22	0.46	3.29***	-1.98**	61.90	78	5.53	1.29	1.29	0.01	58.97
6	224	1.70	0.78	3.75***	-1.57	58.93	147	1.54	0.58	3.57***	-1.67*	59.86	77	5.06	1.26	1.33	0.05	57.14
12	218	6.64	2.20**	7.39***	-1.57	57.33	144	6.68	1.81*	7.03***	-1.48	58.33	74	5.79	1.06	1.00	-0.11	55.41
24	209	-0.94	-0.26	2.48**	-2.91***	59.33	141	-1.35	-0.31	2.52**	-3.12***	60.28	68	7.68	1.08	0.99	-0.24	57.35
36	197	5.51	1.18	2.28**	-1.67*	53.30	136	5.05	0.90	2.10**	-2.37**	56.62	60	15.20	1.74*	2.02*	0.98	46.67

Note:

This table shows the equally- and value-weighted cumulative abnormal returns up to a 36-month period after listing or going public, excluding the initial return. Conventional *t*-statistics (*t*-stat) and bootstrapped skewness-adjusted *t*-statistics (Adj. *t*-stat) are the two-tailed test results of null hypothesis, which means they are equal to zero. The non-parametric Wilcoxon Signed Rank test (*s*-stat) is used to test the null hypothesis that the median abnormal return is zero.

***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2.5 Equally- and valued-weighted buy-and-hold abnormal returns and Wealth Relative (WR) for Thai IPOs listed from 2001 to 2012

Panel A: Equally-Weighted Buy-and-Hold Abnormal Returns (EWBHARs)

Month$_t$	Entire sample							SET sample						MAI sample					
	N_t	$\overline{BHAR}_{i,t}$ (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR <0	WR	N_t	$\overline{BHAR}_{i,t}$ (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR <0	N_t	$\overline{BHAR}_{i,t}$ (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR <0
1	227	-5.39	-3.82***	-2.26**	-5.53***	71.36	0.97	147	-5.29	-3.62***	-1.52	-4.09***	68.03	80	-5.57	-1.86*	-1.32	-3.65***	77.50
2	227	-4.62	-2.39**	-1.92*	-4.87***	71.36	0.97	147	-5.45	-2.80***	-1.84*	-3.56***	67.35	80	-3.09	-0.74	-0.64	-3.37***	78.75
3	227	-4.88	-2.43**	-1.96*	-4.31***	68.72	0.97	147	-5.36	-2.38**	-1.76*	-3.37***	68.03	80	-3.98	-1.01	-0.85	-2.66***	70.00
4	225	-1.51	-0.57	-0.52	-3.10***	64.88	0.99	147	-0.91	-0.27	-0.23	-2.47**	63.95	78	-2.64	-0.62	-0.85	-1.89*	66.67
5	225	-0.40	-0.15	-0.12	-2.53**	64.00	0.99	147	-0.84	-0.26	-0.22	-2.22**	65.99	78	0.42	0.09	0.13	-1.29	60.26
6	224	-1.35	-0.50	-0.46	-2.74***	62.5	0.99	147	-1.35	-0.40	-0.36	-2.45**	63.95	77	-1.36	-0.31	-0.25	-1.32	59.74
12	218	5.40	1.08	1.14	-1.91*	61.92	1.00	144	7.65	1.19	1.26	-1.53	64.58	74	1.02	0.13	0.16	-1.09	56.76
24	209	-5.81	-0.93	-0.9	-3.40***	65.07	0.96	141	-8.45	-1.12	-1.07	-3.22***	65.96	68	-0.34	-0.03	-0.01	-1.41	63.24
36	197	-10.16	-1.42	-1.36	-3.72***	66.49	0.97	136	-16.58	-2.01**	-1.88*	-3.84***	69.85	60	4.51	0.33	0.35	-0.87	60.00

Panel B: Value-Weighted Buy-and-Hold Abnormal Returns (VWBHARs)

Month$_t$	Entire sample							SET sample						MAI sample					
	N_t	$\overline{BHAR}_{i,t}$ (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR <0	WR	N_t	$\overline{BHAR}_{i,t}$ (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR <0	N_t	$\overline{BHAR}_{i,t}$ (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR <0
1	227	0.97	0.95	11.17***	-4.69***	71.37	1.01	147	1.28	1.05	13.09***	-3.38***	68.03	80	-5.60	-2.11**	-1.81*	-3.48***	77.50
2	227	1.93	1.26	7.72***	-4.60***	71.37	1.01	147	2.12	1.16	7.98***	-3.44***	67.35	80	-1.96	-0.46	-0.33	-3.35***	78.75
3	227	-0.73	-0.43	4.06***	-3.82***	68.72	1.00	147	-0.74	-0.36	4.03***	-2.93***	68.03	80	-0.67	-0.17	-0.14	-2.24**	70.00
4	225	0.74	0.36	4.02***	-3.07***	64.89	1.00	147	0.71	0.28	3.97***	-2.50**	63.95	78	1.33	0.33	0.29	-1.39	66.67
5	225	3.17	1.32	4.26***	-2.59***	64.00	1.01	147	3.10	1.05	4.05***	-2.40**	65.99	78	4.72	1.11	1.15	-0.41	60.26
6	224	2.70	1.16	3.96***	-2.73***	62.50	1.01	147	2.70	0.94	3.85***	-2.54**	63.95	77	2.68	0.69	0.69	-0.54	59.74
12	218	17.37	3.48***	6.23***	-2.42**	61.93	1.04	144	17.84	2.88***	6.06***	-1.90**	64.58	74	7.46	1.06	1.04	-0.54	56.76
24	209	9.37	2.14**	6.75***	-3.35***	65.07	1.03	141	9.24	1.77*	6.25***	-3.15***	65.96	68	12.13	1.23	1.23	-0.83	63.24
36	197	26.34	3.75***	2.81***	-3.96***	66.50	1.06	136	26.95	3.17***	2.73***	-3.91***	69.85	60	13.46	1.24	1.38	-0.29	60.00

Note:

This table shows the equally- and value-weighted buy-and-hold abnormal returns and wealth relatives up to a 36-month period after listing or going public, excluding the initial return. Conventional *t*-statistics (*t*-stat) and bootstrapped skewness-adjusted *t*-statistics (Adj. *t*-stat) are the two-tailed test results of null hypothesis, which means they are equal to zero. The non-parametric Wilcoxon Signed Rank test (*s*-stat) is used to test the null hypothesis that the median abnormal return is zero.

***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

2.5.2 Long-run Performance of Thai IPOs According to the Industry Benchmark

In this section the author provides more robustness analysis by investigating industry effects. This study divided the entire sample into 8 sectors based on the Stock Exchange of Thailand's sector classifications. The results of a cross-sectional analysis and the industry-specific CARs and BHARs are presented in Table 2.6 and in Figures 2E-2H (see Appendix 2B, Page 83). It is worth noting that the Thai companies going public in 2004-2012 were not evenly distributed across all industries, with Property & Construction sector firms being most heavily represented. Nevertheless, in the analysis the researcher found a wide variation of the IPOs' performance in the long-run across the industries.

Focusing first on the three-year equally-weighted portfolios, it is evident from Table 2.6 that the highest positive returns were achieved by the IPOs in the Agro & Food sector, for which the EWCARs and EWBHARs were 73.34% (*t*-stat = 0.68) and 55.91% (*t*-stat = 0.47), respectively. IPO firms classified in the Property & Construction sector produced a three-year EWCAR of 32.01% (*t*-stat = 2.09) and a three-year EWBHAR of 27.13% (*t*-stat = 1.47). These findings suggest that investors may generate significant abnormal returns if they buy Property & Construction IPOs at the closing price on the first trading day and hold them for a 36-month period. A possible reason that could explain their over-performance is that after the Asian financial crisis a major government reform was implemented (between 1997 and 1999) in Thailand. The Thai government intended to stimulate economic growth and employment, and so it launched a number of large scale infrastructure projects, including the sky train (BTS) and the underground train (MRT). Therefore, the construction companies could benefit and earn substantial profits. As a result, several fledgling construction companies went public at this time.

However, when this study applied the market value-weighted portfolio, the author found that the IPOs from the Agro & Food and Property & Construction sectors were still over-performing, but less so than in the case of the equally-weighted portfolios.[23]Likewise, it can be clearly seen in Figure 2E that the EWCAR of IPOs in the Agro & Food sector increased sharply between months 29 and 31.

[23] When a value-weighted portfolio of IPOs was employed, the three-year CAR and BHAR for the Agro & Food sector were reduced to 9.53% (*t*-stat = 0.22) and to 16.81% (*t*-stat = 0.27), respectively.

A probable reason which could explain this pattern is the effect of the KASET stock price manipulation.[24] As a result, the Agro & Food sector produced a high positive return. The Financial sector exhibited underperformance in the long-run in the case of both equally-weighted and value-weighted CARs, which were not statistically significant, but still showed over-performance when the author employed BHAR. The Consumer Product, and the Industrial and Technology sectors, both exhibited underperformance in the long-run either using equally-weighted or value-weighted returns, with the exception of the three-year VWCARs and VWBHAR of IPOs for the Service sector which were at the levels 17.26% (*t*- stat = 1.78) and 17.11% (*t*-stat = 1.53), respectively. Panel B in Table 2.6 shows the value-weighted three-year BHARs. It reveals the IPOs' long-term underperformance in the Technology sector and that there is no statistical significance when a conventional *t*-test is employed. When this study applied the bootstrapped skewness-adjusted *t*-test, I found that three-year VWCARs and VWBHARs of IPOs in Technology industry were -24.78% (Adj. *t*-stat = -3.06) and -27.75% (Adj. *t*-stat = -2.65), respectively, but that they showed over-performance in the Resource sector, where they were 4.68% (Adj. *t*-stat = 1.85) and 31.87% (Adj. *t*-stat = 2.06), respectively.[25]

As can be seen in Table 2.6, the long-run performance of Thai IPOs varies across industries. For example, Resources and Property & Construction IPO firms outperform non-IPO companies in the same industry due to the major Thai government reforms in 1999 and 2000. However, the performance of the IPOs in other industries relative to their industry indices is mixed. This study provides evidence supportive of the underperformance of IPOs in Service industry based on the event-time CAR and BHAR estimations using the industry index benchmark and the equally-weighting method. Interestingly, this significant underperformance disappears when a value-weighting method is adopted for both of the return measures. Likewise, the significant

[24] The Thai Ha Public Company Limited (known also as: KASET) was listed on the MAI market in 2005 as a stock from the Agro & Food industry. Its offer price was 1.20 Baht and the closing price on the first trading day was 1.29 Baht. The KASET stock price moved approximately in the band between 0.90 Baht and 1.28 Baht after listing during the subsequent 29 months. It was at the level of 1.51 Baht on 20thMarch 2008, after which it was pumped up to 7.85 Baht (about fivefold) and reached a peak of 8.10 Baht on 14thMay 2008. This speculative effect was commonly attributed to increasing prices of rice in Thailand.

[25] A possible explanation of the finding that the Resource IPOs showed such over-performance could be that there were two large companies listed in December 2001 and in October 2004: Petroleum Authority of Thailand plc. (PTT) and Thai Oil plc. (TOP) (the Thai government is also a majority shareholder in both of them). Their stock price increased rapidly from 35.75 Baht and 44 Baht on the first day of trading to 171 Baht and 91.5 Baht, respectively, after 3 years (which means an increase by 378% (for PTT) and by 108% (for TOP)). Furthermore, both stocks are on a list of companies with the biggest market value (top ten) in the SET. The market values of PTT and TOP when they went public were 100,000 million Baht and 89, 167 million Baht, respectively. As a result, when I used a value-weighted portfolio of Resource IPOs, it shows a much higher over-performance than when using an equally-weighted portfolio of Resource industry IPOs. This may also explain the disappearance of the IPOs underperformance in a value-weighted portfolio in the entire sample as well as in the SET sample.

outperformance of Financial industry related IPOs using equally- and value-weighted BHARs vanishes when considering CAR measures. Additionally, this finding shows that the significant underperformance of Technology IPOs using value-weighted CAR and BHAR changed when the equally-weighted returns are considered. The results are sensitive to any change in IPO return measures. These findings are in line with the argument of Gompers and Lerner (2003) that the relative performance of an IPO sample depends on the method used to examine performance. Furthermore, Ritter and Welch (2002) argue that the characteristics of the data on the IPO sample, in terms of the time period and the selection criteria, also contribute to the observed differences in the findings on long-run IPO performance.

2.5.3 Comparing Long-run IPO Performance Based on the Alternative Benchmarks

Tables 2.7 and 2.8 report the cumulative abnormal returns of Thai IPOs based on the CAPM, FF and SD benchmarks with Brown and Warner (1980) *t*-statistics and the non-parametric Wilcoxon signed rank statistics for 36 months after going public (see more in Tables 2N-2S, Appendix 2A, Pages 77-82). These results are also illustrated graphically in Figures 2I-2N (see Appendix 2B, Page 84). For the entire IPO sample, the equally-weighted portfolio of IPOs underperformed over a three-year horizon period. The equally-weighted CAPM, FF and SD cumulative abnormal returns (CCAR, FFCAR and SDCAR) at month 36 are -0.98% (*t*-stat = -0.12), -34.05% (*t*-stat = -3.86) and -21.25% (*t*-stat = -2.59), respectively. Focusing first on the portfolio of IPOs in relation to the CAPM benchmark, the results are different when the sample is divided into the 2 markets of SET and MAI. For the SET IPO sample, it was found that a portfolio of IPOs underperformed in the long-run and the 3-year CCAR was -10.15% (*t*-stat = -1.13). In addition, the author obtained significant negative abnormal returns based on the signed rank test. In contrast, for the MAI IPOs, it was found that there was a positive return at the end of year 3 using EWCCAR but that this was one with no statistical significance.

Comparing EWCCARs across the three samples in Figure 2I, it is clear that after month 25, a portfolio of MAI IPOs outperformed above the CAPM benchmark and the CCAR increased to 19.05% at the end of year 3. These results are consistent with the findings in Section 2.5.1, where the author analysed the SET and MAI markets returns and used CAR and BHAR to measure the performance of Thai IPOs and found that in the long-run

the IPOs were underperforming in the case of the SET IPOs and over-performing in the case of the MAI IPOs.

The equally-weighted FFCARs of SET IPOs at month 36 was -46.84 (*t*-stat = -4.65). However, the MAI FFCAR was -7.00% (*t*-stat = -0.64). This effect is similar to the findings of Espenlaub *et al.* (2000) who demonstrated that UK IPOs underperformed when the FF three-factor model was used, and that this underperformance was more severe in comparison to the results when other alternative benchmarks were used[26]. Table 2.7 in Panel C, and Figure 2K (see Appendix 2B, Page 85) demonstrated that the CARs adjusted by the SD benchmark from month 1 to year 3 are negative. When the sample is segmented, the SET IPOs show a more dramatic underperformance than the MAI IPOs. At 36 months, the SDCARs of the SET IPOs and of the MAI IPOs are -29.29% (*t*-stat = -3.18) and -4.32% (*t*-stat = -0.33), respectively. This study also obtained negative SD abnormal returns at the end of year 3 using the signed rank test for the entire sample and for the SET IPO sample.

Previous studies show evidence that long-term post event return diminishes or disappears when a value-weighted substitute for an equally-weighted portfolio of IPOs is used. For example, Fama (1988) argues that the CAPM has a systematic problem to explain the abnormal return on categories of small stocks and that equally-weighted portfolio returns allocate more weight to small stocks, so that the so-called "bad model" problems are more severe in inferences from equally-weighted returns. Therefore, in this study an attempt was made to address the "bad model" issue. Value-weighted returns were deliberately considered because they provide the appropriate perspective and thus more correctly capture the entire wealth effects experienced by investors. The 36-month VWCCARs for the entire sample and the SET sample were -51.29% (*t*-stat = -4.22) and -51.53% (*t*-stat = - 4.02), respectively. The researcher also documents significant negative abnormal returns over 36 months after listing for the entire sample and for the SET sample when the non-parametric Wilcoxon signed rank test was applied. However, a portfolio of the MAI IPOs shows a slight over-performance based on the VWCAR using the CAPM as a benchmark, and remains close to a zero return at month 36 after going public with significance at 1% level (CCAR = 0.3% and *t*-stat = - 4.01).

[26] Espenlaub *et al.* (2000) found a 60-month FFCAR of -42.77% (*t*-stat = -10.02), CCAR of 28.67% (*t*-stat = -4.92) and SDCAR of 21.32% (*t*-stat = -4.80) in their sample of UK IPOs issued during 1985-1992. These findings support Fama and French's (1993) argument that the three-factor model overestimates average returns in cases of such firms during the IPO sample period.

Table 2.6 Summary of three-year cumulative, buy-and-hold abnormal returns and wealth relatives for Thai IPOs listed from 2004 to 2012 categorized to 8 sectors

Panel A: Three-year abnormal return of IPOs disaggregated by industry (Equally-Weighted Portfolio of IPOs)

Industry	N	Equally-Weighted Cumulative Abnormal Return (EWCARs)					Equally-Weighted Buy-and-Hold Abnormal Return (EWBHARs)					WR
		3-year CARs (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR<0	3-year BHARs (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR<0	
Agro & Food	4	73.34	0.68	0.82	1.07	25.00	55.91	0.47	0.72	1.07	25.00	1.43
Consumer Products	8	-4.74	-0.16	-0.59	0.41	25.00	-4.33	-0.12	-0.92	0.14	25.00	0.94
Financial	8	-0.38	-0.01	-1.60	-0.52	37.50	14.72	0.33	1.82*	0.11	37.50	1.11
Industrial	25	-3.78	-0.21	-0.38	-0.63	48.00	-8.13	-0.53	-0.07	-1.19	52.00	1.01
Resources	13	-23.69	-1.39	-0.11	0.62	30.77	-8.87	-0.51	0.78	1.16	30.77	0.96
Service	22	-4.90	-0.28	-2.19**	-0.79	40.90	-5.92	-0.32	-2.08**	-1.70*	50.00	1.00
Technology	15	-58.55	-1.18	-0.79	1.07	26.66	-50.71	-1.00	-0.36	0.71	33.33	0.94
Property & Construction	38	32.01	2.09**	0.16	1.16	26.31	27.13	1.47	0.42	-0.01	44.74	1.19

Panel B: Three-year abnormal return of IPOs disaggregated by industry (Valued-Weighted Portfolio of IPOs)

Industry	N	Value-Weighted Cumulative Abnormal Return (VWCARs)					Value-Weighted Buy-and-Hold Abnormal Return (VWBHARs)					WR
		3-year CARs (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR<0	3-year BHARs (%)	*t*-stat	Adj. *t*-stat	*s*-stat	%AR<0	
Agro & Food	4	9.53	0.23	0.72	1.07	25.00	16.81	0.27	0.6	1.07	25.00	1.12
Consumer Products	8	-47.57	-1.65	-1.52	1.21	25.00	-48.47	-1.54	-1.57	1.21	25.00	0.93
Financial	8	-3.79	-0.14	-2.31**	-0.52	37.50	1.28	0.04	2.62***	-0.31	37.50	1.04
Industrial	25	-22.71	-0.67	-1.81*	-0.93	48.00	-11.78	-0.99	-1.29	-1.45	52.00	0.90
Resources	13	4.68	0.37	1.85*	1.07	30.77	31.87	1.88*	2.06**	1.25	30.77	1.12
Service	22	17.26	1.78*	0.10	-0.97	40.90	17.11	1.53	0.03	-1.99**	50.00	1.06
Technology	15	-24.78	-1.02	-3.06***	0.89	26.67	-27.75	-1.23	-2.65***	0.63	33.33	0.90
Property & Construction	38	24.13	2.02**	1.48	1.46	26.32	15.90	1.17	1.81*	-0.29	44.74	1.09

Note:

This table shows the three-year cumulative market-adjusted, buy-and-hold abnormal returns and wealth relatives after listing or going public categorized into 8 industries, excluding the initial return. *t*-statistics and bootstrapped skewness adjusted *t*-statistics (Adj. *t*-test) are the two-tailed test results of null hypothesis which means they are equal to zero. The data include Thai IPOs listed between 2004 and 2012 because the 8 industry indices on the Stock Exchange of Thailand (SET) were calculated since 5th January 2004. The non-parametric Wilcoxon Signed Rank test (*s*-stat) is used to test the null hypothesis that the median abnormal return is zero.

***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively

Again, when the value-weighted return was applied to calculate FFCARs, the results in Table 2.8 in Panel B show that Thai IPOs underperformed the benchmark over 3 years after going public except for the FFCARs in the entire sample and in the SET sample in the first month which are 1.59% (t-stat = 4.80) and 1.98% (*t*-stat = 4.97). However, there are negative abnormal returns for almost every month over 36 months after going public with the sole exception of the first trading month. The 3-year VWFFCARs for the entire sample and for both SET and MAI samples are -13.22% (*t*-stat = -0.83), -13.47% (*t*-stat = -0.95) and -7.88% (*t*-stat = -0.64), respectively. These results also support the findings of Chorruk and Worthington (2010) that Thai IPOs are underperformers in the long-run. In contrast to the findings from Allen *et al.* (1999)'s study, an equally-weighted cumulative market-adjusted return was used, and it was found that Thai IPOs outperform at the end of year 3 after listing. One possible reason for such IPO over-performance reported in Allen *et al.* (1999) may be perhaps the different sample period.

The results of CARs, adjusted by a size control portfolio and value-weighted returns, are reported in Table 2.8 in Panel C and they are also plotted in Figure 2N (see Appendix 2B, Page 85). It can be clearly seen there that Thai IPOs still show a poor performance even in the long-run. The VWCAR after 36 months for the SD model for the entire sample and for both SET and MAI IPOs were -6.96% (*t*-stat = -0.51), -7.00% (*t*-stat = -0.49) and 5.49% (*t*-stat = -0.46), respectively. In line with our expectations, this finding is consistent with the CARs related to the FF three-factor model benchmark because market capitalization and book-to-market value were used to construct 6 portfolios for the SD benchmark.

Moreover, the patterns of FFCARs and SDCARs movement in the 36-month period were similar, irrespective of whether equally-weighted or value-weighted returns were used. Overall, the Thai IPOs' underperformance, based on the FF three-factor model and on the SD model in the long-run using value-weighted returns, is in fact less severe than the underperformance when equally-weighted returns are used, unless the abnormal return is related to CAPM, in which case it shows an even poorer performance. However, the abnormal return of the Thai IPOs, related to the FF benchmark, displays a much greater underperformance than the returns related to other alternative benchmarks.

Table 2.7 The Equally-Weighted (EW) Cumulative Abnormal Returns for the 36 months after going public using the Capital Asset Pricing Model (CAPM), the Fama and French Three-Factor Model (FF) and the Size-Decile Control Portfolio (SD) benchmarks

Panel A: CAPM benchmark

$Month_t$	Entire sample					SET sample					MAI sample				
	N_t	CCAR (%)	*t*-stat	*s*-stat	%AR<0	N_t	CCAR (%)	*t*-stat	*s*-stat	%AR<0	N_t	CCAR (%)	*t*-stat	*s*-stat	%AR<0
1	227	-5.39	-5.95***	-5.49***	69.16	147	-4.97	-6.79***	-4.09***	67.35	80	-6.15	-4.77***	-3.54***	72.50
2	227	-5.06	-3.94***	-3.06***	62.56	147	-5.35	-4.77***	-2.12**	61.90	80	-4.52	-2.79***	-2.40**	63.75
3	227	-5.05	-3.21***	-2.24**	59.03	147	-5.02	-3.62***	-1.28	55.10	80	-5.11	-2.54**	-2.19**	66.25
4	225	-2.29	-1.12	-2.42**	60.44	147	-1.91	-0.97	-1.84*	57.82	78	-2.99	-1.26	-1.62*	65.38
5	225	-1.01	-0.43	-2.61***	61.78	147	-2.33	-1.06	-3.33***	61.90	78	1.49	0.49	0.10	61.54
6	224	-0.44	-0.17	-4.19***	66.96	147	-1.67	-0.68	-3.51***	66.67	77	1.88	0.56	-2.31***	67.53
12	218	1.12	0.30	-2.39**	60.09	144	3.51	0.81	-1.41	59.72	74	-3.58	-0.65	-2.23**	60.81
24	209	-8.92	-1.45	-5.04***	69.86	141	-10.63	-1.52	-3.95***	68.09	68	-5.33	-0.62	-3.15***	73.53
36	197	-0.98	-0.12	-4.77***	70.05	136	-10.15	-1.13	-4.92***	72.06	60	19.05	1.37	-1.18	66.67

Panel B: Fama and French Three-Factor Model benchmark

$Month_t$	Entire sample					SET sample					MAI sample				
	N_t	FFCAR (%)	*t*-stat	*s*-stat	%AR<0	N_t	FFCAR (%)	*t*-stat	*s*-stat	%AR<0	N_t	FFCAR (%)	*t*-stat	*s*-stat	%AR<0
1	227	-5.75	-7.08***	-5.03***	67.40	147	-5.34	-7.82***	-3.79***	65.99	80	-6.51	-6.09***	-3.26***	70.00
2	227	-6.72	-5.84***	-2.47**	61.23	147	-7.22	-7.40***	-1.91*	61.90	80	-5.79	-3.79***	-1.70*	60.00
3	227	-7.42	-5.27***	-1.02	55.07	147	-7.56	-6.16***	-0.56	54.42	80	-7.18	-3.77***	-1.03	56.25
4	225	-5.67	-3.04***	-0.52	54.67	147	-5.18	-2.75***	0.10	53.06	78	-6.59	-2.97***	-1.06	57.69
5	225	-5.41	-2.53**	-0.46	52.00	147	-5.12	-2.35**	-0.57	51.70	78	-5.96	-2.39**	-0.04	53.85
6	224	-5.89	-2.51**	-1.54	53.13	147	-5.37	-2.22**	-1.25	54.42	77	-6.87	-2.50**	-0.87	50.65
12	218	-10.09	-2.86***	-2.21**	55.96	144	-8.54	-2.08**	-1.76*	56.94	74	-13.07	-2.92***	-1.52	54.05
24	209	-31.06	-4.99***	-1.21	53.59	141	-37.97	-5.16***	-0.99	53.90	68	-17.05	-2.10**	-0.66	52.94
36	197	-34.05	-3.86***	-0.23	50.76	136	-46.84	-4.65***	-0.74	52.94	60	-7.00	-0.53	0.83	46.67

Panel C: Size-Decile Control Portfolio benchmark

$Month_t$	Entire sample					SET sample					MAI sample				
	N_t	SDCAR (%)	*t*-stat	*s*-stat	%AR<0	N_t	SDCAR (%)	*t*-stat	*s*-stat	%AR<0	N_t	SDCAR (%)	*t*-stat	*s*-stat	%AR<0
1	227	-5.84	-6.58***	-4.88***	67.84	147	-5.97	-6.85***	-3.73***	66.67	80	-5.60	-6.04***	-3.13***	70.00
2	227	-5.80	-4.58***	-4.27***	63.44	147	-6.84	-5.55***	-3.30***	61.22	80	-3.88	-2.80***	-2.69***	67.50
3	227	-6.55	-4.23***	-4.06***	65.20	147	-6.80	-4.44***	-3.23***	65.31	80	-6.11	-3.38***	-2.43**	65.00
4	225	-6.13	-3.36***	-3.67***	64.89	147	-6.61	-3.67***	-3.06***	63.27	78	-5.23	-2.48**	-2.03**	67.95
5	225	-7.38	-3.59***	-3.68***	66.22	147	-9.56	-4.41***	-3.45***	67.35	78	-3.27	-1.31	-1.56	64.10
6	224	-7.23	-3.19***	-3.63***	62.05	147	-8.83	-3.59***	-3.25***	63.27	77	-4.25	-1.54	-1.71*	59.74
12	218	-9.69	-2.83***	-3.23***	62.84	144	-9.23	-2.32**	-2.42**	63.19	74	-10.67	-2.36**	-2.11**	62.16
24	209	-24.83	-4.33***	-5.32***	66.03	141	-28.69	-4.20***	-4.58***	65.96	68	-17.21	-2.18**	-2.66***	66.18
36	197	-21.25	-2.59**	-4.34***	60.41	136	-29.29	-3.18***	-4.29***	63.24	60	-4.32	-0.33	-1.23	55.00

Note:

This table shows the cumulative abnormal returns from a 1-month to a 36-month period after listing, excluding the initial return (IPO underpricing). The benchmarks used are CAPM, FF and SD models. Brown and Warner's (1980) *t*-statistics (*t*-stat) are the two-tailed test results of a null hypothesis that means they are equal to zero. The non-parametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero.

***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2.8 The Value-Weighted (VW) Cumulative Abnormal Returns for the 36 months after going public using the Capital Asset Pricing Model (CAPM), the Fama and French Three-Factor Model (FF) and the Size-Decile Control Portfolio (SD) benchmarks

Panel A: CAPM benchmark

$Month_t$	Entire sample					SET sample					MAI sample				
	N_t	CCAR (%)	*t*-stat	*s*-stat	%AR<0	N_t	CCAR (%)	*t*-stat	*s*-stat	%AR<0	N_t	CCAR (%)	*t*-stat	*s*-stat	%AR<0
1	227	0.70	1.95*	-5.00***	69.16	147	1.05	2.50**	-3.79***	67.35	80	-6.68	-7.33***	-3.33***	72.50
2	227	-0.66	-1.28	-2.62***	62.56	147	-0.46	-0.77	-1.98**	61.90	80	1.87	-3.21***	-1.81*	63.75
3	227	-3.17	-4.52***	-1.89*	59.03	147	-3.07	-3.81***	-1.40	55.10	80	-0.37	-2.79***	-2.11**	66.25
4	225	-4.17	-5.07***	-2.50**	60.44	147	-4.11	-4.37***	-2.19**	57.82	78	-0.23	-2.49**	-1.27	65.38
5	225	-6.55	-6.63***	-3.14***	61.78	147	-6.73	-5.88***	-3.63***	61.90	78	2.51	-1.02	0.10	61.54
6	224	-9.89	-7.38***	-4.53***	66.96	147	-10.15	-6.77***	-3.92***	66.67	77	-1.54	-1.43	-2.28**	67.53
12	218	-13.98	-4.82***	-3.05***	60.09	144	-13.81	-4.34***	-2.24**	59.72	74	-1.73	-3.66***	-2.59***	60.81
24	209	-41.86	-5.79***	-4.60***	69.86	141	-42.01	-5.46***	-3.62***	68.09	68	-3.08	-4.56***	-3.16***	73.53
36	197	-51.29	-4.22***	-5.17***	70.05	136	-51.53	-4.02***	-5.07***	72.06	60	0.30	-4.01***	-0.92	66.67

Panel B: Fama and French Three-Factor Model benchmark

$Month_t$	Entire sample					SET sample					MAI sample				
	N_t	FFCAR (%)	*t*-stat	*s*-stat	%AR<0	N_t	FFCAR (%)	*t*-stat	*s*-stat	%AR<0	N_t	FFCAR (%)	*t*-stat	*s*-stat	%AR<0
1	227	1.59	4.80***	-4.42***	67.40	147	1.98	4.97***	-3.30***	65.99	80	-6.65	-6.11***	-3.01***	70.00
2	227	-0.75	-1.12	-2.14**	61.23	147	-0.57	-0.74	-1.71*	61.90	80	-4.44	-2.70***	-1.29	60.00
3	227	-2.46	-2.72***	-1.15	55.07	147	-2.36	-2.30**	-0.94	54.42	80	-4.55	-2.26**	-1.05	56.25
4	225	-2.83	-2.72***	-1.09	54.67	147	-2.72	-2.29**	-0.90	53.06	78	-5.26	-2.25**	-0.76	57.69
5	225	-1.59	-1.21	-0.32	52.00	147	-1.51	-1.04	-0.51	51.70	78	-3.27	-1.19	0.42	52.56
6	224	-4.84	-2.58**	-1.63	53.13	147	-4.85	-2.41**	-1.35	54.42	77	-4.53	-1.49	-1.05	50.65
12	218	-1.64	-0.42	-2.44**	55.96	144	-1.42	-0.34	-2.12**	56.94	74	-6.23	-1.35	-1.39	54.05
24	209	-15.69	-1.62	-0.67	53.59	141	-15.95	-1.55	-0.40	53.90	68	-10.22	-1.14	-0.61	52.94
36	197	-13.22	-0.83	-0.41	50.76	136	-13.47	-0.81	-0.95	52.94	60	-7.88	-0.64	1.17	46.67

Panel C: Size-Decile Control Portfolio benchmark

$Month_t$	Entire sample					SET sample					MAI sample				
	N_t	SDCAR (%)	*t*-stat	*s*-stat	%AR<0	N_t	SDCAR (%)	*t*-stat	*s*-stat	%AR<0	N_t	SDCAR (%)	*t*-stat	*s*-stat	%AR<0
1	227	-0.46	-10.16***	-4.37***	67.84	147	-0.19	-23.93***	-3.16***	66.67	80	-6.2	-6.06***	-3.23***	70.00
2	227	-1.40	-7.39***	-3.55***	63.44	147	-1.32	-5.89***	-2.86***	61.22	80	-2.93	-1.76*	-2.46**	67.50
3	227	-3.86	-5.48***	-3.23***	65.20	147	-3.89	-5.20***	-2.55***	61.90	80	-3.22	-1.58	-1.84*	65.00
4	225	-5.65	-5.78***	-3.03***	64.89	147	-5.80	-5.58***	-2.53***	63.27	78	-2.50	-1.05	-1.57	67.95
5	225	-9.06	-5.54***	-3.33***	66.22	147	-9.52	-5.38***	-3.12***	67.35	78	0.54	0.18	-0.91	64.10
6	224	-10.06	-5.52***	-3.16***	62.05	147	-10.55	-5.36***	-2.94***	63.27	77	0.21	0.06	-0.97	59.74
12	218	-7.48	-2.16**	-3.15***	62.84	144	-7.73	-2.10**	-2.55***	63.19	74	-2.31	-0.49	-1.51	62.16
24	209	-20.77	-2.53**	-4.65***	66.03	141	-21.40	-2.46**	-4.20***	65.96	68	-7.49	-0.93	-2.32**	66.18
36	197	-6.94	-0.51	-3.97***	60.41	136	-7.00	-0.49	-4.13***	63.24	60	-5.49	-0.46	-0.81	55.00

Note:

This table shows the cumulative abnormal returns from a 1-month to a 36-month period after listing, excluding the initial return (IPO underpricing). The benchmarks used are CAPM, FF and SD models. Brown and Warner's (1980) *t*-statistics (*t*-stat) are the two-tailed test results of a null hypothesis that means they are equal to zero. The non-parametric Wilcoxon Signed Rank test (*s*-stat) is used to test the null hypothesis that the median abnormal return is zero.

***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

2.5.4 Calendar-time abnormal return regression results

The calendar-time portfolio approach using LCAPM, Fama and French's (1993) three-factor model and Carhart's (1997) four-factor model was also employed as a robustness check for our results. The dependent variable was defined as monthly returns on IPO portfolios between January 2003 and May 2012. The sample size covers a total of 113 months. Monthly returns on the IPO portfolios over the preceding 36 months were regressed on R_{pt}– $R_{ft,}$ *SMB*, *HML*, *LIQ* and *MOM* variables. The maximum number of companies in the IPO portfolio was 122, which occurred in January-May 2006. The minimum number of companies was 30, which occurred in January 2003. The time-series regressions of equally-weighted and value-weighted IPO portfolios were estimated using weighted least squares (WLS) regression.

Table 2.9 presents the estimated intercepts from the regressions as indicators of the risk-adjusted performance of the Thai IPOs. Considering first the long-run performance of the equally-weighted portfolio, reported in Table 2.9 in Panel A, the mean intercept for the FF three-factor model is -2.2% per month for the entire sample. This value implies a three-year abnormal return of -55.1% [i.e. calculated as: $(1 – 0.022)^{36} – 1$]. The *t*-statistic of -6.23 indicates that the average monthly return is statistically significant at a 1% level. Table 2.8 in Panel B presents results when the IPO portfolios were value-weighted. In this case they underperformed by -2.6% (*t*-stat = -11.6) per month, indicating a negative three-year excess return of -61.26%. The results of similar regressions for the SET and MAI IPOs are also reported in the same table. The intercepts for the equally-weighted portfolios of SET and MAI IPOs are -2.3% (*t*-stat = -6.14) and -2.4% (*t*-stat = -5.01), respectively. The *t*-statistics indicate that the intercept is strongly significant for SET. Moreover, when using the value-weighted portfolio approach, this study found that the intercepts are still negative and are statistically significant at 1% levels in the case of either the SET or MAI IPOs. In addition to the FF model, the intercepts obtained from the LCAPM and Carhart's models are also negative. These findings are therefore consistent with the studies of Ritter (1991), Loughran and Ritter (1995), Espenlaub *et al*. (2000), Goergen *et al*. (2007), Su and Bangassa (2011) and Agathee *et al*. (2014) which all indicate IPO underperformance in the long horizon period in the US, UK, China and Mauritius markets based on calendar-time analysis.

In summary, this study can conclude that, based on the calendar-time approach, the Thai IPO firms during the three years period after the issuance significantly underperformed their benchmarks on a risk-adjusted basis using either the equally-weighted or the value-weighted portfolios. These findings are consistent with long-run IPOs underperformance considering the event-time approach relative to the CAPM, FF and SD benchmarks. The author therefore concludes that the use of calendar-time analysis supports the findings that Thai IPOs produced negative abnormal returns.

2.6 Conclusion

In this chapter the researcher re-visited and re-assessed the long-term performance of Initial Public Offerings (IPOs) in Thailand using the data for 227 Thai stocks in the period from 2001 to 2012. This research differs from previous studiess using the Thai market data (e.g. Allen *et al*., 1999; Chorruk and Worthington, 2010, among others) in the following five ways. First, this study used an updated new data set derived from the Thai stock market and considered two stock market segments, namely the SET and the MAI, as benchmarks. Second, this study constructed both equally-weighted and value-weighted portfolios of IPOs for the measurement of the long-term IPO performance, whereas other studies, such as e.g. Chorruk and Worthington (2010), used only equally-weighted portfolio returns. Third, this study presented a cross-sectional pattern of long-term performance by categorising the sample according to exchange and industrial sector classifications. Fourth, apart from the conventional *t*-test, this study employed a wider range of statistical tests including the bootstrapping simulation and non-parametric tests in order to verify the validity of the results for the event-time returns. Finally, the calendar-time approach was also used with a few different models, such as LCAPM, Fama-French and Carhart models, as a further robustness check. To the best of our knowledge, this study is the first about Thailand which presents empirical analysis using the Fama-French factors as well as momentum and liquidity factors, constructed specifically for the Thai stock market, which is another important contribution of this research.

Table 2.9 Calendar-time abnormal returns on IPO portfolio regressions, January 2003- May 2013 using Weighted Least Squares (WLS)

Panel A: Equally-weighted portfolio

	Entire IPOs			SET IPOs			MAI IPOs		
	LCAPM	***FF***	***CARHART***	***LCAPM***	***FF***	***CARHART***	***LCAPM***	***FF***	***CARHART***
Intercept	-0.027 (-5.05)***	-0.022 (-6.23)***	-0.023 (-6.46)***	-0.028 (-5.00)***	-0.023 (-6.14)***	-0.024 (-6.37)***	-0.033 (-5.18)***	-0.024 (-5.01)***	-0.024 (-4.82)***
R_m - R_f	0.261 (5.32)***	0.245 (5.42)***	0.246 (5.51)***	0.274 (5.39)***	0.261 (5.06)***	0.261 (5.09)***	0.129 (2.05)**	0.091 (1.59)	0.091 (1.59)
SMB		-0.047 (0.10)	-0.059 (-0.63)		-0.026 (-0.25)	-0.038 (-0.40)		-0.221 (-2.07)**	-0.223 (-2.06)**
HML		0.062 (0.69)	0.042 (0.45)		0.050 (0.54)	0.028 (0.29)		0.294 (4.09)***	0.292 (3.87)***
MOM			-0.141 (-1.12)			-0.156 (-1.23)			-0.017 (-0.11)
LIQ	0.004 (1.28)			0.004 (1.26)			0.008 (2.64)***		
Adj. R^2	0.180	0.161	0.164	0.175	0.158	0.163	0.045	0.078	0.069

Panel B: Value-weighted portfolio

	Entire IPOs			SET IPOs			MAI IPOs		
	LCAPM	***FF***	***CARHART***	***LCAPM***	***FF***	***CARHART***	***LCAPM***	***FF***	***CARHART***
Intercept	-0.028 (-9.44)***	-0.026 (-11.60)***	-0.026 (-11.16)***	-0.028 (-9.62)***	-0.026 (-11.77)***	-0.026 (-11.31)***	-0.034 (-16.25)***	-0.030 (-20.96)***	-0.030 (-21.82)***
R_m - R_f	0.148 (5.26)***	0.139 (5.05)***	0.138 (4.97)***	0.146 (5.19)***	0.136 (4.95)***	0.136 (4.87)***	0.083 (4.49)***	0.073 (3.47)***	0.073 (3.56)***
SMB		-0.067 (-1.37)	-0.065 (-1.32)		-0.067 (-1.37)	-0.064 (-1.31)		-0.067 (-1.69)*	-0.061 (-1.33)
HML		0.084 (2.20)**	0.088 (2.16)**		0.082 (2.17)**	0.087 (2.16)**		-0.003 (-0.11)	0.008 (0.31)
MOM			0.028 (0.38)			0.032 (0.42)			0.077 (1.38)
LIQ	0.001 (1.22)			0.001 (1.25)			0.003 (2.46)**		
Adj. R^2	0.213	0.229	0.224	0.209	0.225	0.220	0.179	0.153	0.173

Note:

The sample period was January 2003 to May 2012, which consists of 113 months. The maximum number of event companies in the IPO portfolio was 122, which occurred in January-May 2006. The minimum number of event companies was 30, which occurred in January 2003. This table presents the regression results of the calendar-time monthly market adjusted abnormal returns using the market model with controlling liquidity and the Fama and French (1993) three-factor model: $R_{pt} - R_{ft} = \beta_0 + \beta_1(R_{mt} - R_{ft}) + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon$, where R_{pt} is the return of IPO portfolio in month t; R_{ft} is the one-month Thai T-Bill rate, observed at the beginning of month t; R_{mt} is the value-weighted return on the SET index in month t; SMB_t (small minus big) is the monthly return on the zero investment portfolio for the size factor in the stock returns or the difference between the equally-weighted average of the returns on a portfolio of small stocks and a portfolio of big stock, and HML_t (high minus low) is the monthly return on the zero investment portfolio for the book-to-market equity factor in stock returns or the difference between the return on a portfolio of high book-to-market ratio stocks and a portfolio of low book-to-market ratio stocks, constructed independently from the size portfolio. The *t*-statistics are calculated using the time-series standard deviation of the mean monthly abnormal returns. For Carhart's model, the MOM, is the monthly return on past winner stocks minus the monthly return on past loser stock and, is included in the FF model as the additional explanatory variable. The statistical significance is generated after making White heteroskedasticity adjustments. The *t*-statistics are shown in brackets.

***, ** and * indicates statistical significance at the 1, 5 and 10% levels respectively.

Overall, this chapter provides that IPOs in Thailand underperformed in the long-run after their IPOs listing when measured by equally-weighted event time CARs and BHARs and by calendar-time returns. The findings are mostly consistent with previous studies. In addition, it was found that the stock prices of large firms behaved differently from those of small and medium-sized companies. Large IPOs were characterized by poor long-run returns, whereas the IPOs of smaller companies performed better. However, the findings are different when market value-weighted event time is used. The value-weighted returns of IPOs relative to the market over a three-year holding period show an over-performance. Furthermore, when the sample was segmented into industry sectors, the results suggest that investors who used a value-weighted portfolio of IPOs to measure the long-term performance obtained positive abnormal returns in the long-run from the IPOs belonging to the Resource sector. Moreover, the IPOs from the Industrial and Technology sectors were characterised by poor performance.

The findings concerning the performance of Thai IPOs over a long horizon period depend to some degree on the methodology and on the portfolio weighting. The results are sensitive not only to the methodology used, but also to the exact-time-period chosen and the size effect from big-sized companies (e.g. PTT and TOP) going public in the sample period. This implies that investors who measured their investment in the SET IPO companies using the event-time approach with value-weighted CAR and BHAR would conclude that they could gain positive returns in the long-run. However, if they omitted the two big firms from the IPO sample and considered the equally-weighted CAR and BHAR, the event-time returns related to CAPM, FF and SD models and the calendar-time approach, they would conclude that they cannot earn any abnormal returns irrespective of the alternative benchmarks and weighting methods used. In the same vein, after controlling for firm size, the long-term over-performance will disappear for Thai IPOs. The findings of this study may also assist investors to design active trading strategies aiming to generate superior returns by investing in new IPOs in Thailand (e.g. by buying the IPO stocks and/or by short-selling them when they are already listed on the market). In addition to this, any new issuers may benefit from the findings about the IPOs' long-term underperformance due to the higher offering price (lower cost of equity). Finally, the results presented in this study may have broader policy implications for many other emerging markets similar to Thailand, which are expanding globally by implementing economic, trade and financial reforms. These findings may be, therefore, also helpful for regulators overseeing other emerging markets beyond Thailand.

Appendix 2A A list of tables for long-run IPO performance

Table 2A Average market-adjusted returns for Thai IPOs listed from 2001 to 2012, relative to two market benchmarks: SET and MAI and normality test

$Month_t$	N_t	Average market-adjusted returns (AR_t)							
		Mean	**Median**	**Maximum**	**Minimum**	**Std.**	**Skewness**	**Kurtosis**	**Jarque-Bera**
1	227	-5.39	-8.57	106.59	-41.80	21.27	1.68	5.10	7.96***
2	227	0.33	-2.72	86.51	-28.00	15.57	2.21	7.93	10.73***
3	227	0.01	-1.23	64.35	-58.30	12.87	0.60	4.45	7.33***
4	225	2.78	-0.95	140.34	-24.69	18.22	3.84	22.04	24.52***
5	225	1.28	-0.30	49.31	-43.04	11.91	0.78	2.74	5.65***
6	224	0.58	-1.01	97.86	-67.90	14.74	1.51	11.23	13.96***
7	223	-3.03	-2.18	26.55	-147.00	15.17	-4.62	39.49	14610.9***
8	223	0.30	-0.83	63.87	-31.26	12.52	1.85	7.22	585.20***
9	222	0.49	-0.97	82.24	-75.75	14.5	0.73	10.79	1042.9***
10	222	0.96	-0.37	157.87	-41.40	18.16	4.96	36.04	12359.57***
11	220	0.70	-1.63	61.79	-24.12	12.8	1.88	6.08	447.76***
12	218	0.20	-0.51	49.92	-30.97	11.46	1.03	3.62	149.8***
13	218	-2.50	-1.68	30.18	-68.35	12.68	-1.46	5.82	367.78***
14	218	-0.72	-0.94	92.26	-35.47	11.94	2.31	17.10	2721.37***
15	217	-0.62	-1.51	44.24	-45.93	10.29	0.45	3.72	124.8***
16	217	-1.30	-1.61	39.98	-43.00	10.33	0.22	2.97	76.69***
17	217	-0.66	-1.20	68.32	-65.12	12.98	0.27	7.14	439.8***
18	214	-1.62	-1.46	35.01	-40.89	9.68	0.04	2.65	58.71***
19	213	-0.01	-1.22	54.75	-31.25	10.27	1.00	4.08	174.06***
20	211	-1.26	-2.03	106.92	-29.63	12.3	3.55	28.64	7296.59***
21	210	-1.97	-2.68	68.57	-35.63	10.21	1.70	11.05	1113.86***
22	210	-0.89	-0.70	67.35	-31.86	11.31	1.28	6.68	424.97***
23	209	0.61	-1.21	79.67	-32.02	12.41	2.32	11.29	1236.39***
24	209	-1.08	-2.69	79.20	-60.99	13.14	1.61	10.71	1035.28***
25	207	1.52	-0.25	254.23	-47.45	22.38	7.48	80.52	55125.57***
26	207	0.88	-0.35	68.87	-36.30	11.74	1.41	6.27	387.77***
27	207	-0.29	-0.96	54.18	-32.07	9.92	1.06	5.78	310.32***
28	207	0.99	-0.60	103.57	-45.68	14.41	3.02	18.67	3166.48***
29	206	1.39	0.38	97.43	-30.09	13.97	2.48	13.06	1595.64***
30	206	-0.70	-2.00	63.01	-46.38	12.26	1.05	5.25	260.63***
31	205	2.20	-1.45	301.46	-60.76	25.93	8.16	89.06	66709.92***
32	203	0.19	-0.36	34.43	-26.50	10.02	0.48	1.17	18.03***
33	200	0.51	-0.56	107.64	-66.09	16.78	3.52	22.07	4254.84***
34	199	0.33	-1.50	62.90	-30.78	92.54	1.87	7.96	609.46***
35	198	0.83	-0.27	50.59	-20.01	10.64	1.79	5.50	338.82***
36	197	0.08	-0.47	127.78	-30.16	13.34	4.75	43.60	15538.43***

Note:

This table shows descriptive statistics of market-adjusted returns up to a 36-month period after listing or going public, excluding the initial return (IPO underpricing). Jarque-Bera test results of null hypothesis which distributions they are normal.

***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2B Average and cumulative market-adjusted returns (equally-weighted) for Thai IPOs listed from 2001 to 2012, relative to two market benchmarks: SET and MAI

Month$_t$	**N_t**	**$\overline{AR}_{i,t}$ (%)**	**SD**	***t*-stat**	**$\overline{CAR}_{i,t}$ (%)**	**Std.**	***t*-stat**	**Bootstrap Skewness-Adj *t*-stat**	**Wilcoxon Signed Rank test**	**%AR<0**
1	227	-5.39	21.27	-3.82***	-5.39	21.27	-3.92***	-2.26***	-5.53***	71.37
2	227	0.33	15.57	0.32	-5.06	27.9	-2.73***	-2.10***	-4.59***	69.16
3	227	0.01	12.87	0.01	-5.05	29.81	-2.55**	-2.03***	-3.84***	66.52
4	225	2.78	18.22	2.25**	-2.27	36.53	-0.93	-0.87	-2.48**	60.00
5	225	1.28	11.91	1.61	-0.99	38.71	-0.38	-0.37	-1.83*	60.89
6	224	0.58	14.74	0.23	-0.41	39.81	-0.15	-0.27	-1.77*	58.93
7	223	-3.03	15.17	-3.01***	-3.44	40.11	-1.28	-1.30	-2.13**	56.50
8	223	0.30	12.52	0.36	-3.13	42.95	-1.09	-1.14	-1.93*	56.50
9	222	0.49	14.5	0.47	-2.64	45.94	-0.86	-0.94	-1.63	56.76
10	222	0.96	18.16	0.79	-1.68	49.96	-0.50	-0.60	-1.43	55.41
11	220	0.70	12.8	1.08	-0.98	54.62	-0.27	-0.31	-1.30	57.27
12	218	0.20	11.46	0.32	-0.78	56.79	-0.20	-0.23	-1.29	57.34
13	218	-2.50	12.68	-2.91***	-3.28	58.26	-0.83	-0.83	-1.67*	55.96
14	218	-0.72	11.94	-0.89	-4.00	58.42	-1.01	-1.00	-1.90*	55.96
15	217	-0.62	10.29	-0.86	-4.62	59.58	-1.14	-1.11	-1.87*	53.00
16	217	-1.30	10.33	-1.85*	-5.92	60.88	-1.43	-1.37	-2.02*	55.30
17	217	-0.66	12.98	-0.75	-6.58	62.18	-1.56	-1.49	-2.06*	54.84
18	214	-1.62	9.68	-1.71*	-8.19	63.55	-1.89*	-1.68*	-2.32*	57.94
19	213	-0.01	10.27	-0.60	-8.21	65.6	-1.83*	-1.71*	-2.41*	58.69
20	211	-1.26	12.3	-2.26**	-9.47	66.13	-2.08**	-2.05**	-2.77*	59.24
21	210	-1.97	10.21	-3.29***	-11.44	67.7	-2.45**	-2.42**	-3.03***	60.00
22	210	-0.89	11.31	-1.14	-12.33	70.21	-2.59**	-2.50**	-3.00***	59.52
23	209	0.61	12.41	0.07	-11.72	72.22	-2.35**	-2.43**	-2.95***	60.77
24	209	-1.08	13.14	-1.19	-12.80	71.73	-2.58**	-2.62**	-3.06***	59.33
25	207	1.52	22.38	1.16	-11.28	71.91	-2.26**	-2.31**	-2.83**	60.87
26	207	0.88	11.74	1.08	-10.40	71.48	-2.09**	-2.17**	-2.56**	57.49
27	207	-0.29	9.92	-0.42	-10.69	72.8	-2.11**	-2.19**	-2.51**	58.45
28	207	0.99	14.41	0.99	-9.69	74.55	-1.91*	-1.98**	-2.29**	55.07
29	206	1.39	13.97	0.92	-8.31	74.56	-1.60	-1.82*	-1.92*	54.37
30	206	-0.70	12.26	-0.82	-9.01	74.63	-1.78*	-1.94*	-1.95*	55.34
31	205	2.20	25.93	1.28	-6.80	80.48	-1.21	-1.44	-1.61	53.66
32	203	0.19	10.02	-0.97	-6.62	81.35	-1.16	-1.53	-1.68*	54.19
33	200	0.51	16.78	-0.46	-6.11	81.23	-1.06	-1.61	-1.84*	55.50
34	199	0.33	92.54	0.42	-5.77	122.7	-0.98	-1.51	-1.82*	54.77
35	198	0.83	10.64	-0.14	-4.94	82.58	-0.84	-1.53	-1.80*	53.54
36	197	0.08	13.34	0.14	-4.86	83.13	-0.82	-1.49	-1.83*	53.57

Note:

This table shows the equally-weighted market-adjusted and cumulative abnormal returns (EWCARs) up to a 36-month period after listing or going public, excluding the initial return. Conventional *t*-statistics and *p*-values are the two-tailed test results of null hypothesis which means they are equal to zero. The non-parametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero.

***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2C Cumulative abnormal returns for SET IPOs listed from 2001 to 2012 categorized by the board listing, relative to SET benchmark

Month$_t$	**N_t**	**$\overline{CAR}_{i,t}$ (%)**	**Std.**	***t*-stat**	**Bootstrap Skewness-Adj *t*-stat**	**Wilcoxon Signed Rank test**	**%AR<0**
1	147	-5.29	17.72	-3.62***	-1.52	-4.09***	68.03
2	147	-5.66	23.89	-2.87**	-1.87*	-3.33***	64.63
3	147	-5.30	26.66	-2.41**	-1.76*	-2.94***	64.63
4	147	-2.31	34.83	-0.80	-0.71	-1.94**	58.50
5	147	-2.02	11.91	-0.67	-0.60	-1.65**	61.90
6	147	-1.52	39.6	-0.47	-0.42	-1.68**	59.86
7	146	-5.14	40.52	-1.53	-1.34	-2.20***	58.22
8	146	-4.77	44.43	-1.30	-1.16	-1.92**	59.59
9	146	-3.98	45.57	-1.06	-0.96	-1.65*	58.22
10	146	-1.45	50.69	-0.35	-0.31	-1.11	55.48
11	146	-0.39	54.84	-0.09	-0.06	-1.09	58.22
12	144	-0.14	57.67	-0.03	-0.01	-1.12	58.33
13	144	-3.36	58.82	-0.69	-0.64	-1.47	56.94
14	144	-5.48	60.52	-1.09	-1.01	-1.78*	56.25
15	144	-6.69	61.69	-1.30	-1.20	-1.90*	52.78
16	144	-8.99	62.91	-1.72*	-1.57	-2.11**	55.56
17	144	-10.62	64.18	-1.99**	-1.80*	-2.36**	56.94
18	143	-1.13	9.68	-1.71*	-2.06**	-2.79***	60.84
19	143	-12.31	67.01	-2.20**	-1.98**	-2.66***	59.44
20	142	-14.10	67.61	-2.48**	-2.21**	-2.89***	60.56
21	141	-16.49	69.15	-2.83***	-2.49**	-3.09***	61.70
22	141	-18.33	71.85	-3.03***	-2.65***	-3.19***	62.41
23	141	-18.51	73.2	-3.00***	-2.64***	-3.18***	63.12
24	141	-19.43	73.05	-3.16***	-2.76***	-3.16***	60.28
25	141	-20.47	72.94	-3.33***	-2.89***	-3.37***	63.12
26	141	-19.52	72.79	-3.18***	-2.78***	-3.19***	60.99
27	141	-19.70	73.9	-3.66***	-2.77***	-3.14***	61.70
28	141	-17.99	75.51	-2.83***	-2.52**	-2.85***	57.45
29	140	-17.23	75.51	-2.70***	-2.41**	-2.54**	56.43
30	140	-18.36	75.48	-2.88***	-2.55**	-2.68***	58.57
31	140	-17.76	76.55	-2.75***	-2.45**	-2.47**	58.57
32	140	-17.30	77.74	-2.63**	-2.37**	-2.36**	57.86
33	139	-18.35	77.72	-2.78***	-2.49**	-2.46**	58.27
34	139	-18.40	78.74	-2.75***	-2.47**	-2.48**	57.55
35	138	-19.04	78.18	-2.86***	-2.55**	-2.57**	56.52
36	136	-19.63	78.35	-2.92***	-2.60**	-2.69***	56.62

Note:

This table shows the equally-weighted cumulative abnormal returns (EWCARs) up to a 36-month period after listing or going public, excluding the initial return. Conventional *t*-statistics are the two-tailed test results of null hypothesis which means they are equal to zero. The non-parametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero. ***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2D Cumulative abnormal returns for MAI IPOs listed from 2001 to 2012 categorized by the board listing, relative to MAI benchmark

Month$_t$	**N_t**	**$\overline{CAR}_{i,t}$ (%)**	**Std.**	***t*-stat**	**Bootstrap Skewness-Adj *t*-stat**	**Wilcoxon Signed Rank test**	**%AR<0**
1	80	-5.57	26.7	-1.86*	-1.32	-3.64***	77.50
2	80	-3.95	34.2	-1.03	-0.86	-3.22***	77.50
3	80	-4.59	35.05	-1.17	-0.98	-2.46**	70.00
4	78	-2.35	39.76	-0.52	-0.45	-1.57	62.82
5	78	0.80	42.72	0.16	0.21	-0.88	58.97
6	77	0.56	40.43	0.12	0.17	-0.71	57.14
7	77	-1.48	39.45	-0.33	-0.27	-0.65	53.25
8	77	-1.29	40.16	-0.28	-0.23	-0.63	50.65
9	76	-1.43	46.91	-0.27	-0.22	-0.52	53.95
10	76	-3.49	48.84	-0.62	-0.55	-0.87	55.26
11	74	-2.86	54.51	-0.45	-0.40	-0.69	55.41
12	74	-2.58	55.35	-0.40	-0.35	-0.69	55.41
13	74	-3.68	57.53	-0.55	-0.50	-0.83	54.05
14	74	-1.67	54.41	-0.26	-0.22	-0.75	55.41
15	73	-1.03	55.39	-0.16	-0.12	-0.57	53.42
16	73	-0.35	56.65	-0.05	-0.02	-0.48	54.79
17	73	0.90	57.68	0.13	0.17	-0.08	50.68
18	71	1.52	60.22	0.21	0.25	0.06	52.11
19	70	-0.12	62.29	-0.02	0.02	-0.37	57.14
20	69	-2.20	62.68	-0.29	-0.25	-0.77	56.52
21	69	-4.47	64.38	-0.58	-0.53	-0.95	56.52
22	69	-3.40	66.12	-0.43	-0.39	-0.61	53.62
23	68	-2.70	69.43	-0.32	-0.29	-0.56	55.88
24	68	-4.12	68.28	-0.50	-0.45	-0.76	57.35
25	66	4.05	67.2	0.49	0.53	-0.05	56.06
26	66	4.78	66.13	0.59	0.64	0.23	50.00
27	66	4.27	68.09	0.51	0.55	0.20	51.52
28	66	3.72	70.74	0.43	0.47	0.27	50.00
29	66	4.80	70.74	0.55	0.60	0.38	50.00
30	66	5.01	70.76	0.58	0.62	0.51	48.48
31	65	11.25	85.66	1.06	1.14	0.82	43.08
32	63	8.68	86.81	0.79	0.85	0.51	46.03
33	61	9.71	86.21	0.88	0.94	0.36	49.18
34	60	11.48	88.46	1.01	1.08	0.44	48.33
35	60	12.46	88.73	1.09	1.17	0.59	46.67
36	60	13.91	89.43	1.20	1.30	0.78	46.67

Note:

This table shows the equally-weighted cumulative abnormal returns (EWCARs) up to a 36-month period after listing or going public, excluding the initial return. Conventional *t*-statistics are the two-tailed test results of null hypothesis which means they are equal to zero. The non-parametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero.

***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2E Buy-and-hold abnormal returns and wealth relatives for Thai IPOs listed from 2001 to 2012, relative to two market benchmarks: SET and MAI

Month$_t$	**N_t**	**$\overline{BHAR}_{i,t}$ (%)**	**Std.**	***t*-stat**	**Bootstrap Skewness-Adj *t*-stat**	**Wilcoxon Signed Rank test**	**%AR<0**	**WR**
1	227	-5.39	21.27	-3.82***	-2.26**	-5.53***	71.36	0.97
2	227	-4.62	29.16	-2.39**	-1.92*	-4.87***	71.36	0.97
3	227	-4.88	30.3	-2.43**	-1.96*	-4.31***	68.72	0.97
4	225	-1.51	39.72	-0.57	-0.52	-3.10***	64.88	0.99
5	225	-0.40	40.4	-0.15	-0.12	-2.53**	64.00	0.99
6	224	-1.35	40.09	-0.50	-0.46	-2.74***	62.5	0.99
7	223	-2.70	41.18	-0.98	-0.90	-2.68***	60.09	0.98
8	223	-2.07	44.72	-0.69	-0.64	-2.36**	60.98	0.98
9	222	-1.12	49.06	-0.34	-0.31	-2.41**	61.26	0.98
10	222	0.85	55.9	0.23	0.25	-2.12**	59.00	0.99
11	220	3.92	66.93	0.87	0.91	-1.91*	61.36	1.00
12	218	5.40	72.59	1.08	1.14	-1.91*	61.92	1.00
13	218	4.68	76.24	0.91	0.95	-2.03**	60.09	1.00
14	218	3.31	78.08	0.63	0.65	-2.34**	61.00	1.00
15	217	2.08	76.96	0.40	0.42	-2.49**	60.37	0.99
16	217	0.50	77.01	0.10	0.11	-2.57**	60.83	0.98
17	217	-0.72	77.26	-0.14	-0.12	-2.75***	61.75	0.98
18	214	-1.46	80.36	-0.27	-0.25	-2.92***	63.55	0.97
19	213	-0.92	84.83	-0.16	-0.14	-2.99***	62.44	0.98
20	211	-2.62	84.5	-0.45	-0.43	-3.24***	62.55	0.97
21	210	-5.01	82.99	-0.88	-0.84	-3.32***	65.23	0.96
22	210	-4.37	86.33	-0.73	-0.71	-3.26***	64.28	0.96
23	209	-3.42	91.2	-0.54	-0.52	-3.12***	64.11	0.97
24	209	-5.81	90.05	-0.93	-0.9	-3.40***	65.07	0.96
25	207	-5.83	92.05	-0.91	-0.88	-3.56***	64.25	0.95
26	207	-6.40	88.32	-1.04	-1.00	-3.54***	63.28	0.95
27	207	-6.26	90.24	-1.00	-0.96	-3.48***	63.76	0.95
28	207	-5.84	95.62	-0.88	-0.85	-3.58***	65.70	0.95
29	206	-5.90	95.64	-0.89	-0.85	-3.46***	63.10	0.96
30	206	-6.77	98.13	-0.99	-0.96	-3.57***	63.10	0.96
31	205	-4.49	103.24	-0.62	-0.60	-3.24***	62.92	0.97
32	203	-5.24	104.18	-0.72	-0.69	-3.19***	63.05	0.97
33	200	-7.75	100.86	-1.09	-1.05	-3.50***	64.50	0.96
34	199	-6.98	107.73	-0.91	-0.89	-3.52***	64.82	0.96
35	198	-9.61	98.07	-1.38	-1.32	-3.53***	64.64	0.97
36	197	-10.16	100.05	-1.42	-1.36	-3.72***	66.49	0.97

Note:

This table shows the equally-weighted buy-and-hold abnormal returns (EWBHARs) and wealth relatives up to a 36-month period after listing or going public, excluding the initial return. Conventional *t*-statistics and skewness-adjusted *t*-statistics are the two-tailed test results of null hypothesis, which means they are equal to zero. The non-parametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero.

***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2F Buy-and-hold abnormal returns and wealth relatives for SET IPOs listed from 2001 to 2012, relative to SET benchmark

Month$_t$	**N_t**	**$\overline{BHAR}_{i,t}$ (%)**	**Std.**	***t*-stat**	**Bootstrap Skewness-Adj *t*-stat**	**Wilcoxon Signed Rank test**	**%AR<0**
1	147	-5.29	17.72	-3.62***	-1.52	-4.09***	68.03
2	147	-5.45	23.60	-2.80***	-1.84*	-3.56***	67.35
3	147	-5.36	27.30	-2.38**	-1.76*	-3.37***	68.03
4	147	-0.91	40.83	-0.27	-0.23	-2.47**	63.95
5	147	-0.84	39.64	-0.26	-0.22	-2.22**	65.99
6	147	-1.35	40.76	-0.40	-0.36	-2.45**	63.95
7	146	-3.02	43.25	-0.84	-0.77	-2.58**	62.33
8	146	-1.94	47.24	-0.50	-0.45	-2.07**	62.33
9	146	-1.48	49.79	-0.36	-0.32	-2.44**	63.70
10	146	2.13	57.98	0.44	0.48	-1.74*	55.48
11	146	5.48	68.68	0.96	1.02	-1.67*	64.38
12	144	7.65	77.34	1.19	1.26	-1.53	64.58
13	144	6.29	79.38	0.95	1.00	-1.75*	61.11
14	144	4.57	84.70	0.65	0.68	-2.13**	61.81
15	144	2.04	81.81	0.30	0.32	-2.52**	60.42
16	144	-0.48	81.44	-0.07	-0.05	-2.65***	61.11
17	144	-2.81	82.07	-0.41	-0.39	-2.94***	65.28
18	143	-4.62	83.58	-0.66	-0.63	-3.27***	66.43
19	143	-3.43	88.20	-0.59	-0.44	-3.08***	62.94
20	142	-5.22	87.17	-0.71	-0.68	-3.09***	64.08
21	141	-7.67	84.58	-1.08	-1.02	-3.04***	66.67
22	141	-7.44	87.87	-1.01	-0.96	-3.11***	65.96
23	141	-6.25	93.91	-0.79	-0.76	-3.12***	65.96
24	141	-8.45	89.38	-1.12	-1.07	-3.22***	65.96
25	141	-9.94	90.48	-1.30	-1.24	-3.50***	65.25
26	141	-9.87	89.13	-1.32	-1.25	-3.44***	65.25
27	141	-9.63	92.38	-1.24	-1.18	-3.43***	65.96
28	141	-8.64	97.15	-1.06	-1.01	3.48***	68.79
29	140	-9.31	94.82	-1.16	-1.11	-3.39***	65.71
30	140	-10.73	95.94	-1.32	-1.26	-3.66***	66.43
31	140	-10.85	95.93	-1.34	-1.27	-3.44***	67.86
32	140	-9.74	99.43	-1.16	-1.11	-3.21***	67.14
33	139	-12.62	98.18	-1.52	-1.44	-3.44***	67.63
34	139	-11.34	107.84	-1.24	-1.19	-3.52***	66.91
35	138	-15.06	93.28	-1.90*	-1.77*	-3.53***	67.39
36	136	-16.58	96.35	-2.01**	-1.88*	-3.84***	69.85

Note:

This table shows the equally-weighted buy-and-hold abnormal returns (EWBHARs) and wealth relatives up to a 36-month period after listing or going public, excluding the initial return. Conventional *t*-statistics and skewness-adjusted *t*-statistics are the two-tailed test results of null hypothesis, which means they are equal to zero. The non-parametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero.

***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2G Buy-and-hold abnormal returns and wealth relatives for MAI IPOs listed from 2001 to 2012, relative to MAI benchmark

Month$_t$	**N_t**	**$\overline{BHAR}_{i,t}$**	**Std.**	***t*-stat**	**Bootstrap Skewness-Adj *t*-stat**	**Wilcoxon Signed Rank test**	**%AR<0**
1	80	-5.57	26.71	-1.86*	-1.32	-3.65***	77.50
2	80	-3.09	37.41	-0.74	-0.64	-3.37***	78.75
3	80	-3.98	35.31	-1.01	-0.85	-2.66***	70.00
4	78	-2.64	37.79	-0.62	-0.85	-1.89*	66.67
5	78	0.42	42.05	0.09	0.13	-1.29	60.26
6	77	-1.36	39.05	-0.31	-0.25	-1.32	59.74
7	77	-2.09	37.19	-0.49	-0.42	-0.99	55.84
8	77	-2.31	39.79	-0.51	-0.44	-1.19	58.44
9	76	-0.42	47.94	-0.08	-0.04	-0.79	56.58
10	76	-1.62	51.96	-0.27	-0.23	-1.21	56.58
11	74	0.84	63.67	0.11	0.14	-0.94	55.41
12	74	1.02	65.94	0.13	0.16	-1.09	56.76
13	74	1.54	70.16	0.19	0.22	-1.10	58.11
14	74	0.85	63.72	0.12	0.15	-1.07	59.46
15	73	2.16	66.92	0.28	0.31	-0.81	60.27
16	73	2.43	67.92	0.31	0.34	-0.75	60.27
17	73	3.39	67.11	0.43	0.47	-0.53	54.79
18	71	4.92	73.60	0.56	0.61	-0.42	57.75
19	70	4.21	77.85	0.45	0.49	-0.90	61.43
20	69	2.73	79.07	0.29	0.32	-1.35	59.42
21	69	0.42	79.98	0.04	0.07	-1.51	62.32
22	69	1.9	83.36	0.19	0.22	-1.36	60.87
23	68	2.44	85.68	0.24	0.26	-1.14	60.29
24	68	-0.34	91.83	-0.03	-0.01	-1.41	63.24
25	66	2.96	95.42	0.25	0.28	-1.16	62.12
26	66	1.00	86.78	0.09	0.12	-1.24	59.09
27	66	0.95	85.72	0.09	0.11	-1.12	59.09
28	66	0.16	92.72	0.01	0.04	-1.17	59.09
29	66	1.32	97.70	0.11	0.13	-1.08	57.58
30	66	1.62	102.89	0.13	0.15	-0.92	56.06
31	65	9.21	117.09	0.63	0.67	-0.58	52.31
32	63	4.75	114.24	0.33	0.35	-0.83	53.97
33	61	3.35	106.71	0.25	0.27	-1.02	57.38
34	60	3.09	107.71	0.22	0.24	-1.00	60.00
35	60	2.91	108.07	0.21	0.23	-1.00	58.33
36	60	4.51	107.45	0.33	0.35	-0.87	60.00

Note:

This table shows the equally-weighted buy-and-hold abnormal returns (EWBHARs) and wealth relatives up to a 36-month period after listing or going public, excluding the initial return. Conventional *t*-statistics and skewness-adjusted *t*-statistics are the two-tailed test results of null hypothesis, which means they are equal to zero. The non-parametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero.

***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2H Cumulative abnormal returns for Thai IPOs listed from 2001 to 2012 categorized by the board listing, relative to two market benchmarks: SET and MAI indices

Month$_t$	**N_t**	**$\overline{CAR}_{i,t}$ (%)**	**Std.**	***t*-stat**	**Bootstrap Skewness-Adj *t*-stat**	**Wilcoxon Signed Rank test**	**%AR<0**
1	227	0.97	15.35	0.95	11.17***	-4.69***	71.36
2	227	1.45	21.83	1.00	7.15***	-4.23***	69.16
3	227	-0.94	24.38	-0.58	4.41***	-3.30***	66.52
4	225	-0.19	28	-0.10	3.92***	-2.37**	60.00
5	225	1.42	32.51	0.65	3.46***	-1.95*	60.88
6	224	1.7	32.65	0.78	3.75***	-1.57	58.93
7	223	-0.66	33.88	-0.29	2.90***	-1.92*	56.50
8	223	0.45	34.37	0.19	3.41***	-1.90*	56.50
9	222	2.69	37.75	1.06	4.60***	-1.70*	56.75
10	222	5.25	39.99	1.95*	7.82***	-1.02	55.40
11	220	6.66	44.53	2.22**	7.67***	-1.54	57.27
12	218	6.64	44.53	2.20**	7.39***	-1.57	57.33
13	218	4.76	42.94	1.64	6.30***	-1.88*	55.96
14	218	4.78	43.18	1.63	6.59***	-1.94*	55.96
15	217	3.11	45.66	1.00	4.21***	-1.62	52.99
16	217	3.42	47.23	1.07	4.43***	-1.70*	55.3
17	217	0.81	46.61	0.26	3.04***	-2.25**	54.84
18	214	2.2	48.4	0.66	3.41***	-2.71***	57.94
19	213	2.82	48.91	0.84	3.87***	-2.21**	58.68
20	211	3.13	48.69	0.93	4.27***	-2.41**	59.24
21	210	1.33	49.93	0.39	2.98***	-2.78***	60.00
22	210	1.12	52.22	0.32	2.81***	-2.77***	59.52
23	209	-0.1	52.43	-0.03	2.54**	-2.97***	60.77
24	209	-0.94	52.77	-0.26	2.48**	-2.91***	59.33
25	207	-2.39	54.42	-0.63	2.35**	-2.99***	60.87
26	207	-1.62	54.24	-0.43	2.25**	-2.57**	57.49
27	207	3.77	61.25	0.88	2.19**	-2.77***	58.45
28	207	3.11	61.15	0.75	2.10**	-2.28**	55.07
29	206	3.79	58.23	0.93	2.44**	-1.84**	54.37
30	206	3.25	58.99	0.81	2.28**	-2.05**	55.34
31	205	5.89	61.48	1.37	3.04***	-1.75*	53.66
32	203	6.72	63.39	1.51	2.95***	-1.68*	54.19
33	200	5.16	63.96	1.14	2.36**	-1.95*	55.50
34	199	4.33	64.48	0.95	2.15**	-1.84*	54.77
35	198	5.87	64.87	1.27	2.50**	-1.80*	53.54
36	197	5.51	65.74	1.18	2.28**	-1.67*	53.30

Note:

This table shows the value-weighted cumulative abnormal returns (VWCARs) up to a 36-month period after listing or going public, excluding the initial return. Conventional *t*-statistics are the two-tailed test results of null hypothesis which means they are equal to zero. The nonparametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero. ***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2I Buy-and-hold abnormal returns for Thai IPOs listed from 2001 to 2012 categorized by the board listing, relative to two market benchmarks: SET and MAI indices

Month$_t$	**N_t**	$\overline{BHAR}_{i,t}$	**Std.**	***t*-stat**	**Bootstrap Skewness-Adj *t*-stat**	**Wilcoxon Signed Rank test**	**%AR<0**
1	227	0.97	15.35	0.95	11.17***	-4.69***	71.37
2	227	1.93	23.2	1.26	7.72***	-4.60***	71.37
3	227	-0.73	25.57	-0.43	4.06***	-3.82***	68.72
4	225	0.74	31.23	0.36	4.02***	-3.07***	64.89
5	225	3.17	35.95	1.32	4.26***	-2.59***	64.00
6	224	2.70	34.73	1.16	3.96***	-2.73***	62.50
7	223	2.19	38.91	0.84	3.13***	-2.63***	60.09
8	223	3.37	39.22	1.28	4.63***	-2.52**	60.99
9	222	7.94	50.84	2.33**	5.43***	-2.69***	61.26
10	222	12.34	60.79	3.02***	6.22***	-2.00**	59.01
11	220	17.88	78.73	3.37***	5.39***	-2.37**	61.36
12	218	17.37	73.8	3.48***	6.23***	-2.42**	61.93
13	218	13.73	61.5	3.30***	7.91***	-2.17**	60.09
14	218	13.20	62.44	3.12***	7.61***	-2.42**	61.01
15	217	13.30	72.4	2.71***	5.01***	-2.41**	60.37
16	217	14.29	73.45	2.87***	5.33***	-2.52**	60.83
17	217	9.45	66.12	2.10**	4.60***	-3.00***	61.75
18	214	10.92	67.65	2.36**	5.06***	-3.16***	63.55
19	213	11.76	67.26	2.55**	6.07***	-2.69***	62.44
20	211	12.06	62.79	2.79***	7.86***	-2.96***	62.56
21	210	9.91	59.4	2.42**	7.34***	-3.23***	65.24
22	210	9.88	61.63	2.36**	7.78***	-3.13***	64.29
23	209	8.93	61.63	2.10**	7.26***	-3.12***	64.11
24	209	9.37	63.14	2.14**	6.75***	-3.35***	65.07
25	207	10.68	68.65	2.24**	5.09***	-3.42***	64.25
26	207	11.48	66.25	2.49**	5.25***	-3.21***	63.29
27	207	29.09	100.31	4.17***	3.12***	-3.62***	63.77
28	207	24.47	90.36	3.99***	3.65***	-3.68***	65.70
29	206	20.89	85.65	3.50***	3.07***	-3.35***	63.11
30	206	19.59	84.04	3.43***	3.15***	-3.60***	63.11
31	205	23.63	88.4	3.83***	3.49***	-3.39***	62.93
32	203	25.23	91.41	3.93***	3.35***	-3.50***	63.05
33	200	23.85	93.45	3.61***	2.78***	-3.77***	64.50
34	199	24.06	94.57	3.59***	2.83***	-3.58***	64.82
35	198	24.95	93.53	3.75***	3.01***	-3.64***	64.65
36	197	26.34	98.63	3.75***	2.81***	-3.96***	66.50

Note:

This table shows the value-weighted buy-and-hold abnormal returns (VWBHARs) up to a 36-month period after listing or going public, excluding the initial return. Conventional *t*-statistics are the two-tailed test results of null hypothesis which means they are equal to zero. The nonparametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero. ***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2J Cumulative abnormal returns for SET IPOs listed from 2001 to 2012 categorized by the board listing, relative to SET benchmark

Month$_t$	**N_t**	**$\overline{CAR}_{i,t}$ (%)**	**Std.**	***t*-stat**	**Bootstrap Skewness-Adj *t*-stat**	**Wilcoxon Signed Rank test**	**%AR<0**
1	147	1.28	14.76	1.05	13.09***	-3.38***	68.03
2	147	1.67	21.1	0.96	7.54***	-3.16***	64.63
3	147	-0.92	23.84	-0.47	4.35***	-2.52**	64.63
4	147	-0.26	27.54	-0.12	3.91***	-2.03**	58.50
5	147	1.22	32.22	0.46	3.29***	-1.98**	61.90
6	147	1.54	32.51	0.58	3.57***	-1.67*	59.86
7	146	-0.84	33.86	-0.30	2.90***	-2.10**	58.22
8	146	0.28	34.27	0.10	3.33***	-1.96**	59.59
9	146	2.56	37.54	0.82	4.33***	-1.98**	58.22
10	146	5.30	39.84	1.61	7.49***	-1.12	55.48
11	146	6.74	44.4	1.83*	7.34***	-1.50	58.22
12	144	6.68	44.41	1.81*	7.03***	-1.48	58.33
13	144	4.77	42.62	1.34	6.01***	-1.83*	56.94
14	144	4.74	42.93	1.33	6.22***	-1.99**	56.25
15	144	3.01	45.54	0.79	3.99***	-1.82*	52.78
16	144	3.28	47.09	0.84	4.16***	-1.93**	55.56
17	144	0.57	46.44	0.15	2.93***	-2.51**	56.94
18	143	1.92	48.32	0.48	3.18***	-2.94***	60.84
19	143	2.60	48.81	0.64	3.61***	-2.38**	59.44
20	142	3.04	48.63	0.74	4.05***	-2.50**	60.56
21	141	1.21	49.85	0.29	2.89***	-2.78***	61.70
22	141	0.91	52.19	0.21	2.71***	-2.89***	62.41
23	141	-0.52	52.1	-0.12	2.51**	-3.12***	63.12
24	141	-1.35	52.43	-0.31	2.52**	-3.12***	60.28
25	141	-3.05	54.25	-0.67	2.49**	-3.35***	63.12
26	141	-2.23	54.15	-0.49	2.34**	-3.05***	60.99
27	141	3.42	61.48	0.66	2.05**	-3.28***	61.70
28	141	2.71	61.29	0.53	1.97**	-2.79***	57.45
29	140	3.41	58.24	0.69	2.26**	-2.39**	56.43
30	140	2.91	59.04	0.58	2.14**	-2.60***	58.57
31	140	5.52	61.32	1.07	2.79***	-2.36**	58.57
32	140	6.47	63.34	1.21	2.75***	-2.19**	57.86
33	139	4.88	63.91	0.90	2.21**	-2.46**	58.27
34	139	3.92	64.27	0.72	2.00**	-2.40**	57.55
35	138	5.50	64.71	1.00	2.32**	-2.37**	56.52
36	136	5.05	65.61	0.90	2.10**	-2.37**	56.62

Note:

This table shows the value-weighted cumulative abnormal returns (VWCARs) up to a 36-month period after listing or going public, excluding the initial return. Conventional *t*-statistics are the two-tailed test results of null hypothesis which means they are equal to zero. The nonparametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero. ***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2K Buy-and-hold abnormal returns for Thai IPOs listed from 2001 to 2012 categorized by the board listing, relative to SET benchmark

Month$_t$	**N_t**	$\overline{BHAR}_{i,t}$	**Std.**	***t*-stat**	**Bootstrap Skewness-Adj *t*-stat**	**Wilcoxon Signed Rank test**	**%AR<0**
1	147	1.28	14.76	1.05	13.09***	-3.38***	68.03
2	147	2.12	22.23	1.16	7.98***	-3.44***	67.35
3	147	-0.74	25.05	-0.36	4.03***	-2.93***	68.03
4	147	0.71	31.02	0.28	3.97***	-2.50**	63.95
5	147	3.10	35.87	1.05	4.05***	-2.40**	65.99
6	147	2.70	34.76	0.94	3.85***	-2.54**	63.95
7	146	2.20	39.18	0.68	3.07***	-2.56**	62.33
8	146	3.42	39.33	1.05	4.50***	-2.27**	62.33
9	146	8.02	51.06	1.90*	5.20***	-2.73**	63.70
10	146	12.67	61.17	2.50**	6.05***	-1.86*	60.27
11	146	18.36	79.42	2.79***	5.25***	-1.93**	64.38
12	144	17.84	74.32	2.88***	6.06***	-1.90**	64.58
13	144	14.02	61.42	2.74***	7.64***	-1.79*	61.11
14	144	13.50	62.67	2.58**	7.36***	-2.05**	61.81
15	144	13.60	73.03	2.23**	4.85***	-2.24**	60.42
16	144	14.59	74.05	2.36**	5.15***	-2.39**	61.11
17	144	9.54	66.49	1.72*	4.40***	-2.86***	65.28
18	143	10.97	67.96	1.93**	4.80***	-3.10***	66.43
19	143	11.84	67.39	2.10**	5.77***	-2.56**	62.94
20	142	12.27	62.7	2.33**	7.54***	-2.60***	64.08
21	141	10.05	59.08	2.02**	7.03***	-2.84***	66.67
22	141	9.89	61.08	1.92**	7.33***	-2.83***	65.96
23	141	8.75	60.98	1.70*	6.66***	-2.92***	65.96
24	141	9.24	62.14	1.77*	6.25***	-3.15***	65.96
25	141	10.47	67.54	1.84*	4.69***	-3.43***	65.25
26	141	11.46	65.71	2.07**	4.95***	-3.18***	65.25
27	141	29.93	101.37	3.51***	3.05***	-3.63***	65.96
28	141	25.08	90.93	3.27***	3.55***	-3.53***	68.79
29	140	21.24	85.8	2.93***	2.96***	-3.33***	65.71
30	140	19.99	84.13	2.81***	3.05***	-3.61***	66.43
31	140	24.07	88.42	3.22***	3.36***	-3.48***	67.86
32	140	25.85	91.63	3.34***	3.25***	-3.43***	67.14
33	139	24.48	93.95	3.07***	2.71***	-3.64***	67.63
34	139	24.61	94.82	3.06***	2.75***	-3.45***	66.91
35	138	25.56	93.9	3.20***	2.93***	-3.53***	67.39
36	136	26.95	99.22	3.17***	2.73***	-3.91***	69.85

Note:

This table shows the value-weighted buy-and-hold abnormal returns (VWBHARs) up to a 36-month period after listing or going public, excluding the initial return. Conventional *t*-statistics are the two-tailed test results of null hypothesis which means they are equal to zero. The nonparametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero. ***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2L Cumulative abnormal returns for MAI IPOs listed from 2001 to 2012 categorized by the board listing, relative to MAI benchmark

Month$_t$	**N_t**	**$\overline{CAR}_{i,t}$ (%)**	**Std.**	***t*-stat**	**Bootstrap Skewness-Adj *t*-stat**	**Wilcoxon Signed Rank test**	**%AR<0**
1	80	-5.60	23.78	-2.11**	-1.81*	-3.48***	77.50
2	80	-3.08	33.48	-0.82	-0.64	-3.09***	77.50
3	80	-1.36	33.77	-0.36	-0.31	-2.04**	70.00
4	78	1.41	36.32	0.34	0.32	-1.08	62.82
5	78	5.53	37.89	1.29	1.29	0.01	58.97
6	77	5.06	35.15	1.26	1.33	0.05	57.14
7	77	3.24	34.17	0.83	0.78	0.24	53.25
8	77	4.01	36.16	0.97	0.91	0.25	50.65
9	76	5.42	41.91	1.13	1.07	0.31	53.95
10	76	4.16	43.11	0.84	0.81	-0.02	55.26
11	74	4.96	46.98	0.91	0.89	-0.06	55.41
12	74	5.79	47.08	1.06	1.00	-0.11	55.41
13	74	4.50	49.35	0.78	0.76	-0.27	54.05
14	74	5.52	48.2	0.99	0.88	-0.36	55.41
15	73	5.21	48.23	0.92	0.9	-0.29	53.42
16	73	6.33	49.92	1.08	1.03	-0.12	54.79
17	73	5.90	49.85	1.01	1.00	-0.01	50.68
18	71	8.12	49.77	1.37	1.40	0.28	52.11
19	70	7.45	50.86	1.23	1.27	-0.03	57.14
20	69	5.11	49.94	0.85	0.95	-0.27	56.52
21	69	3.83	51.58	0.62	0.66	-0.43	56.52
22	69	5.46	52.59	0.86	0.94	-0.14	53.62
23	68	8.74	58.37	1.23	1.18	-0.18	55.88
24	68	7.68	58.79	1.08	0.99	-0.24	57.35
25	66	11.58	56.07	1.68*	1.67*	0.21	56.06
26	66	11.43	54.53	1.70*	1.79*	0.66	50.00
27	66	11.11	55.7	1.62	1.70*	0.51	51.52
28	66	11.58	57.5	1.64	1.69*	0.51	50.00
29	66	11.95	57.55	1.69*	1.77*	0.62	50.00
30	66	10.39	57.59	1.47	1.52	0.71	48.48
31	65	13.73	64.25	1.72*	1.87*	1.07	43.08
32	63	12.03	64.12	1.49	1.69*	0.83	46.03
33	61	11.28	64.71	1.36	1.52	0.57	49.18
34	60	12.93	68.24	1.47	1.64	0.69	48.33
35	60	13.90	67.69	1.59	1.88*	0.84	46.67
36	60	15.20	67.52	1.74*	2.02*	0.98	46.67

Note:

This table shows the equally-weighted cumulative abnormal returns (EWCARs) up to a 36-month period after listing or going public, excluding the initial return. Conventional *t*-statistics are the two-tailed test results of null hypothesis which means they are equal to zero. The nonparametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero. ***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2M Buy-and-hold abnormal returns and wealth relatives for MAI IPOs listed from 2001 to 2012, relative to MAI benchmark

Month$_t$	**N_t**	$\overline{BHAR}_{i,t}$	**Std.**	***t*-stat**	**Bootstrap Skewness-Adj *t*-stat**	**Wilcoxon Signed Rank test**	**%AR<0**
1	80	-5.60	23.78	-2.11**	-1.81*	-3.48***	77.50
2	80	-1.96	38.06	-0.46	-0.33	-3.35***	78.75
3	80	-0.67	34.71	-0.17	-0.14	-2.24**	70.00
4	78	1.33	35.43	0.33	0.29	-1.39	66.67
5	78	4.72	37.59	1.11	1.15	-0.41	60.26
6	77	2.68	34.08	0.69	0.69	-0.54	59.74
7	77	2.05	32.78	0.55	0.52	-0.24	55.84
8	77	2.39	36.75	0.57	0.54	-0.45	58.44
9	76	6.20	46.11	1.17	1.12	0.04	56.58
10	76	5.27	51.59	0.89	0.81	-0.27	56.58
11	74	7.64	61.41	1.07	1.04	-0.33	55.41
12	74	7.46	60.83	1.06	1.04	-0.54	56.76
13	74	7.48	62.81	1.02	1.02	-0.52	58.11
14	74	6.90	56.9	1.04	1.05	-0.81	59.46
15	73	6.95	57.17	1.04	1.08	-0.64	60.27
16	73	8.05	58.81	1.17	1.15	-0.54	60.27
17	73	7.57	57.71	1.12	1.19	-0.44	54.79
18	71	9.87	60.78	1.37	1.52	-0.15	57.75
19	70	9.97	64.48	1.29	1.46	-0.55	61.43
20	69	7.75	64.41	1.00	1.09	-1.02	59.42
21	69	6.83	65.8	0.86	0.89	-1.09	62.32
22	69	9.61	72.42	1.10	1.14	-0.85	60.87
23	68	12.74	73.94	1.42	1.48	-0.65	60.29
24	68	12.13	81.42	1.23	1.23	-0.83	63.24
25	66	15.23	88.9	1.39	1.39	-0.68	62.12
26	66	11.83	76.65	1.25	1.28	-0.60	59.09
27	66	11.49	72.42	1.29	1.4	-0.62	59.09
28	66	11.70	76.25	1.25	1.39	-0.46	59.09
29	66	13.61	82.1	1.35	1.43	-0.38	57.58
30	66	11.14	81.61	1.11	1.23	-0.36	56.06
31	65	14.50	87.6	1.33	1.54	-0.03	52.31
32	63	12.11	85.77	1.12	1.34	-0.22	53.97
33	61	10.46	81.05	1.01	1.14	-0.57	57.38
34	60	12.35	88.44	1.08	1.17	-0.54	60.00
35	60	12.03	84.5	1.10	1.25	-0.36	58.33
36	60	13.46	84.17	1.24	1.38	-0.29	60.00

Note:

This table shows the value-weighted buy-and-hold abnormal returns (VWBHARs) and wealth relatives up to a 36-month period after listing or going public, excluding the initial return. Conventional *t*-statistics and skewness-adjusted *t*-statistics are the two-tailed test results of null hypothesis, which means they are equal to zero. The nonparametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero.

***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2N The equally-weighted (EW) cumulative abnormal returns for the 36 months after going public using the Capital Asset Pricing Model (CAPM) benchmark

Month	Full sample					SET sample					MAI sample				
	CCAR (%)	Std.	t-stat	Wilcoxon	%AR<0	CCAR (%)	Std.	t-stat	Wilcoxon	%AR<0	CCAR (%)	Std.	t-stat	Wilcoxon	%AR<0
1	-5.39	22.32	-5.95***	-5.49***	69.16	-4.97	18.51	-6.79***	-4.09***	67.35	-6.15	28.13	-4.77***	-3.54***	72.50
2	-5.06	17.81	-3.94***	-3.06***	62.56	-5.35	15.66	-4.77***	-2.12**	61.90	-4.52	21.26	-2.79***	-2.40**	63.75
3	-5.05	13.58	-3.21***	-2.24**	59.03	-5.02	14.69	-3.62***	-1.28	55.10	-5.11	11.32	-2.54**	-2.19**	66.25
4	-2.29	19.18	-1.12	-2.42**	60.44	-1.91	17.95	-0.97	-1.84*	57.82	-2.99	21.38	-1.26	-1.62*	65.38
5	-1.01	13.7	-0.43	-2.61***	61.78	-2.33	14.24	-1.06	-3.33***	61.90	1.49	12.08	0.49	0.10	61.54
6	-0.44	15.12	-0.17	-4.19***	66.96	-1.67	16.17	-0.68	-3.51***	66.67	1.88	12.97	0.56	-2.31***	67.53
7	-1.54	13.09	-0.55	-4.74***	67.71	-2.98	12.47	-1.12	-4.04***	68.49	1.19	14.27	0.33	-2.58**	66.23
8	-1.24	13.75	-0.41	-4.13***	64.57	-2.97	14.14	-1.04	-3.54***	65.07	2.05	13.05	0.52	-2.19**	63.64
9	-0.75	16.48	-0.23	-4.09***	66.22	-1.82	16.35	-0.58	-3.25***	64.38	1.27	16.77	0.30	-2.42**	69.74
10	0.21	20.14	0.06	-4.39***	65.77	1.49	22.91	0.39	-2.06**	58.90	-2.29	12.24	-0.46	-4.63***	78.95
11	0.92	15.22	0.25	-3.41***	63.18	2.97	15.75	0.72	-2.01**	62.33	-3.12	14.11	-0.60	-3.09***	64.86
12	1.12	12.22	0.30	-2.39**	60.09	3.51	12.98	0.81	-1.41	59.72	-3.58	10.66	-0.65	-2.23**	60.81
13	0.75	13.56	0.19	-4.12***	66.97	3.42	14.58	0.76	-3.04***	67.36	-4.48	11.38	-0.77	-2.86***	66.22
14	0.03	12.84	0.01	-4.79***	69.72	2.52	11.5	0.54	-3.38***	67.36	-4.84	15.19	-0.80	-3.62***	74.32
15	-0.59	11.54	-0.14	-3.99***	63.59	1.63	11.3	0.33	-3.64***	65.28	-4.93	12.05	-0.79	-1.70*	60.27
16	-1.89	11.82	-0.42	-4.69***	67.74	-0.45	12.1	-0.09	-4.49***	71.53	-4.70	11.18	-0.73	-1.66*	60.27
17	-2.69	13.44	-0.58	-5.28***	72.35	-2.22	13.09	-0.41	-4.82***	73.61	-3.60	14.01	-0.54	-2.32**	69.86
18	-4.31	10.42	-0.87	-5.77***	71.96	-4.26	10.61	-0.74	-5.23***	74.83	-4.37	10.03	-0.63	-2.58**	66.20
19	-4.32	11.88	-0.85	-3.22***	68.08	-4.02	11.91	-0.68	-2.55**	67.83	-4.91	11.9	-0.69	-1.99**	68.57
20	-5.59	10.82	-1.06	-5.83***	73.93	-5.44	10.76	-0.89	-5.02***	74.65	-5.83	11.01	-0.78	-3.02***	72.46
21	-7.55	11.82	-1.34	-5.49***	73.81	-7.64	13.11	-1.19	-4.51***	72.34	-7.32	8.66	-0.94	-3.06***	76.81
22	-8.44	12.34	-1.46	-6.01***	71.43	-9.28	11.89	-1.39	-5.77***	73.05	-6.68	13.17	-0.84	-2.22**	68.12
23	-7.83	13.75	-1.32	-3.45***	61.72	-9.67	11.46	-1.42	-3.19***	61.70	-4.00	17.5	-0.48	-1.49	61.76
24	-8.92	14.42	-1.45	-5.04***	69.86	-10.63	13.77	-1.52	-3.95***	68.09	-5.33	15.78	-0.62	-3.15***	73.53
25	-7.39	23.74	-1.15	-4.87***	75.36	-11.11	12.67	-1.55	-4.97***	79.43	0.47	37.6	0.05	-1.55	66.67
26	-6.52	12.47	-0.99	-4.15***	65.22	-10.29	12.69	-1.40	-3.96***	67.38	1.46	12.09	0.14	-1.54	60.61
27	-6.8	11.7	-1.01	-3.51***	65.70	-10.53	11.57	-1.40	-2.84***	65.25	1.06	12.07	0.10	-2.02**	66.67
28	-5.78	14.95	-0.84	-3.41***	63.29	-9.33	16.53	-1.20	-2.83***	64.54	1.72	10.99	0.16	-1.80*	60.61
29	-4.39	14.91	-0.62	-3.61***	63.11	-8.56	15.35	-1.08	-3.23***	63.57	4.43	13.93	0.41	-1.67*	62.12
30	-5.10	12.44	-0.70	-4.71***	68.93	-9.79	10.79	-1.20	-4.40***	72.14	4.84	15.46	0.44	-1.91*	62.12
31	-2.89	26.18	-0.38	-3.64***	66.83	-9.58	17.17	-1.16	-3.77***	69.29	11.48	39.3	0.91	-0.87	61.54
32	-2.77	11.2	-0.35	-3.31***	63.55	-9.65	11.48	-1.15	-2.68***	65.00	12.08	10.61	0.94	-1.92**	60.32
33	-2.26	18.15	-0.28	-5.92***	73.50	-10.09	17.06	-1.18	-5.38***	74.10	14.73	20.42	1.12	-2.61***	72.13
34	-1.92	13.17	-0.24	-3.99***	66.83	-10.06	12.88	-1.16	-3.59***	67.63	15.78	13.9	1.18	-1.84*	65.00
35	-1.10	10.82	-0.13	-3.72***	67.17	-9.75	10.13	-1.11	-3.70***	69.57	17.78	12.24	1.30	-1.22	61.67
36	-0.98	14.52	-0.12	-4.77***	70.05	-10.15	16.33	-1.13	-4.92***	72.06	19.05	9.3	1.37	-1.18	66.67

This table shows the CARs from a 1-month to a 36-month period after listing. The benchmark used is CAPM. Brown and Warner's (1980) *t*-statistics are the two-tailed test results of a null hypothesis that means they are equal to zero. The non-parametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero. ***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2O The value-weighted (VW) cumulative abnormal returns for the 36 months after going public using the Capital Asset Pricing Model (CAPM) benchmark

Month	Full sample					SET sample					MAI sample				
	CCAR (%)	Std.	t-stat	Wilcoxon	%AR<0	CCAR (%)	Std.	t-stat	Wilcoxon	%AR<0	CCAR (%)	Std.	t-stat	Wilcoxon	%AR<0
1	0.70	16.14	1.95*	-5.00***	69.16	1.05	15.45	2.50**	-3.79***	67.35	-6.68	25.67	-7.33***	-3.33***	72.50
2	-0.66	14.01	-1.28	-2.62***	62.56	-0.46	13.56	-0.77	-1.98**	61.90	1.87	21.24	-3.21***	-1.81*	63.75
3	-3.17	10.4	-4.52***	-1.89*	59.03	-3.07	10.32	-3.81***	-1.40	55.10	-0.37	11.79	-2.79***	-2.11**	66.25
4	-4.17	11.41	-5.07***	-2.50**	60.44	-4.11	10.73	-4.37***	-2.19**	57.82	-0.23	21.2	-2.49**	-1.27	65.38
5	-6.55	11.77	-6.63***	-3.14***	61.78	-6.73	11.72	-5.88***	-3.63***	61.90	2.51	11.78	-1.02	0.10	61.54
6	-9.89	10.92	-7.38***	-4.53***	66.96	-10.15	10.81	-6.77***	-3.92***	66.67	-1.54	12.99	-1.43	-2.28**	67.53
7	-12.62	10.93	-8.08***	-4.63***	67.71	-12.93	10.75	-7.48***	-3.85***	68.49	-1.57	14.18	-1.80*	-2.28**	66.23
8	-14.63	10.17	-8.64***	-3.64***	64.57	-14.98	9.99	-8.01***	-3.08***	65.07	-1.03	13.38	-1.97**	-1.87	63.64
9	-14.3	12.13	-7.14***	-3.59***	66.22	-14.57	11.99	-6.64***	-2.69***	64.38	-1.44	14.72	-2.23**	-2.56**	69.74
10	-13.15	11.61	-5.22***	-3.07***	65.77	-13.18	11.62	-4.77***	-1.28	58.90	-4.06	10.06	-2.94***	-4.38***	78.95
11	-13.92	11.29	-5.22***	-2.94***	63.18	-13.82	11.27	-4.72***	-1.66*	62.33	-3.46	11.43	-3.45***	-3.09***	64.86
12	-13.98	9.68	-4.82***	-3.05***	60.09	-13.81	9.59	-4.34***	-2.24**	59.72	-1.73	11.36	-3.66***	-2.59***	60.81
13	-16.79	12.94	-5.36***	-4.45***	66.97	-16.59	13.04	-4.87***	-3.33***	67.36	-3.48	10.5	-4.06***	-3.16***	66.22
14	-19.73	9.68	-5.82***	-4.75***	69.72	-19.50	9.63	-5.33***	-3.42***	67.36	-3.38	10.65	-4.41***	-4.03***	74.32
15	-21.31	10.16	-6.07***	-3.75***	63.59	-21.06	10.21	-5.56***	-2.98***	65.28	-2.17	9	-4.62***	-2.16**	60.27
16	-23.47	9.24	-6.41***	-4.66***	67.74	-23.29	9.26	-5.90***	-4.17***	71.53	-0.55	8.68	-4.55***	-1.55	60.27
17	-29.85	12.49	-5.84***	-5.90***	72.35	-29.88	12.53	-5.50***	-5.23***	73.61	-1.97	10.84	-4.71***	-2.52**	69.86
18	-30.15	7.88	-5.67***	-5.92***	71.96	-30.13	7.84	-5.33***	-5.16***	74.83	-1.3	8.65	-4.78***	-2.44**	66.20
19	-32.14	9.54	-5.86***	-3.75***	68.08	-32.13	9.51	-5.52***	-2.92***	67.83	-1.74	10	-4.92***	-2.15**	68.57
20	-30.79	13.28	-5.12***	-5.97***	73.93	-30.57	13.37	-4.78***	-4.82***	74.65	-3.12	10.38	-5.15***	-3.30***	72.46
21	-35.32	10.79	-5.34***	-6.15***	73.81	-35.23	10.89	-5.02***	-5.13***	72.34	-1.92	7.98	-5.28***	-3.48***	76.81
22	-38.25	8.45	-5.57***	-6.12***	71.43	-38.24	8.23	-5.25***	-5.72***	73.05	-1.19	12.05	-5.32***	-2.23***	68.12
23	-40.73	8.34	-5.75***	-3.34***	61.72	-40.97	7.27	-5.45***	-3.17***	61.70	2.98	19.81	-4.35***	-1.59	61.76
24	-41.86	8.23	-5.79***	-4.60***	69.86	-42.01	8.01	-5.46***	-3.62***	68.09	-3.08	11.75	-4.56***	-3.16***	73.53
25	-42.77	13.96	-5.78***	-5.80***	75.36	-42.94	13.52	-5.46***	-5.60***	79.43	-0.52	21.24	-4.51***	-1.50	66.67
26	-44.73	9.61	-5.92***	-4.83***	65.22	-44.87	9.56	-5.59***	-4.32***	67.38	-2.45	10.52	-4.67***	-1.79*	60.61
27	-39.90	23.55	-4.22***	-3.82***	65.70	-39.75	23.96	-3.97***	-3.35***	65.25	-1.41	10.01	-4.74***	-1.86*	66.67
28	-42.78	10.77	-4.40***	-3.54***	63.29	-42.74	10.78	-4.15***	-3.00***	64.54	-0.51	10.24	-4.70***	-1.40	60.61
29	-39.49	16.77	-3.66***	-3.77***	63.11	-39.27	16.97	-3.45***	-3.46***	63.57	-0.60	11.09	-4.67***	-1.56	62.12
30	-41.87	7.13	-3.80***	-5.30***	68.93	-41.62	6.84	-3.59***	-4.57***	72.14	-2.86	11.73	-4.83***	-2.13	62.12
31	-42.61	15.56	-3.80***	-3.61***	66.83	-42.53	15.04	-3.60***	-3.38***	69.29	2.58	23.85	-4.21***	-0.60	61.54
32	-44.98	8.73	-3.94***	-3.45***	63.55	-44.98	8.69	-3.74***	-2.99***	65.00	-0.61	9.37	-4.20***	-1.67	60.32
33	-46.38	11.19	-4.00***	-5.84***	73.50	-46.42	10.76	-3.80***	-4.89***	74.10	-0.73	17.99	-4.19***	-2.88	72.13
34	-48.38	10.05	-4.10***	-4.08***	66.83	-48.48	9.89	-3.90***	-3.63***	67.63	-0.69	13.06	-4.19***	-1.48	65.00
35	-49.30	7.2	-4.12***	-3.80***	67.17	-49.42	7.05	-3.92***	-3.56***	69.57	-0.26	9.83	-4.13***	-0.63	61.67
36	-51.29	12.89	-4.22***	-5.17***	70.05	-51.53	13.09	-4.02***	-5.07***	72.06	0.30	7.35	-4.01***	-0.92	66.67

This table shows the CARs from a 1-month to a 36-month period after listing. The benchmark used is CAPM. Brown and Warner's (1980) *t*-statistics are the two-tailed test results of a null hypothesis that means they are equal to zero. The non-parametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero. ***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2P The equally-weighted (EW) cumulative abnormal returns for the 36 months after going public using the Fama and French three factor model benchmark

Month	Full sample					SET sample					MAI sample				
	FFCAR (%)	Std.	t-stat	Wilcoxon	%AR<0	FFCAR (%)	Std.	t-stat	Wilcoxon	%AR<0	FFCAR (%)	Std.	t-stat	Wilcoxon	%AR<0
1	-5.75	23.39	-7.08***	-5.03***	67.40	-5.34	19.74	-7.82***	-3.79***	65.99	-6.51	29.05	-6.09***	-3.26***	70.00
2	-6.72	17.55	-5.84***	-2.47**	61.23	-7.22	15.54	-7.40***	-1.91*	61.90	-5.79	20.74	-3.79***	-1.70*	60.00
3	-7.42	14.61	-5.27***	-1.02	55.07	-7.56	15.7	-6.16***	-0.56	54.42	-7.18	12.42	-3.77***	-1.03	56.25
4	-5.67	19.76	-3.04***	-0.52	54.67	-5.18	19.22	-2.75***	0.10	53.06	-6.59	20.8	-2.97***	-1.06	57.69
5	-5.41	14.18	-2.53**	-0.46	52.00	-5.12	15.07	-2.35**	-0.57	51.70	-5.96	12.4	-2.39**	-0.04	53.85
6	-5.89	17.95	-2.51**	-1.54	53.13	-5.37	19.89	-2.22**	-1.25	54.42	-6.87	13.61	-2.50**	-0.87	50.65
7	-7.63	14.13	-2.98***	-2.28**	56.95	-8.03	14.04	-2.99***	-2.81***	63.01	-6.86	14.22	-2.31**	0.08	45.45
8	-7.96	14.7	-2.89***	-1.46	54.26	-8.60	14.32	-2.97***	-1.57	56.16	-6.74	15.49	-2.12**	-0.21	50.65
9	-7.82	15.59	-2.63***	-0.96	57.66	-8.16	15.55	-2.56**	-0.84	57.53	-7.17	15.76	-2.12**	-0.55	57.89
10	-8.02	19.02	-2.54***	-2.42**	59.46	-6.65	21.74	-1.80*	-1.34	57.53	-10.66	11.63	-2.68***	-2.27**	63.16
11	-8.25	15.23	-2.47***	-1.41	56.36	-6.77	15.35	-1.72*	-0.98	54.79	-11.09	15.09	-2.66***	-1.04	59.46
12	-10.09	14.89	-2.86***	-2.21**	55.96	-8.54	15.8	-2.08**	-1.76*	56.94	-13.07	13.05	-2.92***	-1.52	54.05
13	-12.39	14.65	-3.29***	-2.94***	61.01	-11.33	15.82	-2.59**	-2.65***	61.11	-14.43	12.1	-3.06***	-1.41	60.81
14	-13.72	13.94	-3.51***	-1.98**	55.05	-13.69	12.68	-2.99***	-1.76*	54.86	-13.73	16	-2.79***	-0.88	55.41
15	-15.12	13.04	-3.73***	-2.01**	54.84	-15.99	12.22	-3.34***	-2.78***	58.33	-13.38	14.43	-2.62***	0.36	47.95
16	-16.83	13.34	-3.98***	-2.31**	58.53	-18.65	13.84	-3.71***	-2.80***	63.19	-13.21	12.19	-2.50**	0.01	49.32
17	-18.97	15.16	-4.28***	-3.28***	63.59	-22.4	13.71	-4.10***	-3.75***	68.06	-12.13	17.38	-2.20**	-0.46	54.79
18	-21.68	12.78	-4.58***	-3.87***	63.55	-25.37	12.92	-4.42***	-3.52***	62.94	-14.33	12.54	-2.44**	-1.75*	64.79
19	-22.52	13.43	-4.63***	-1.09	52.58	-26.03	13.11	-4.40***	-0.97	53.85	-15.53	14.14	-2.56**	-0.47	50.00
20	-25.03	12.68	-4.88***	-3.36***	59.72	-28.67	12.44	-4.66***	-2.86***	59.15	-17.76	13.24	-2.77***	-1.72*	60.87
21	-28.12	14.58	-5.10***	-4.02***	64.76	-32.05	15.38	-4.92***	-3.75***	65.96	-20.26	12.88	-2.98***	-1.61	62.32
22	-30.89	15.05	-5.30***	-3.14***	60.48	-36.16	14.26	-5.15***	-3.75***	63.12	-20.26	16.3	-2.91***	-0.26	55.07
23	-30.24	15.99	-4.96***	-0.36	53.11	-37.19	13.51	-5.17***	-1.19	56.03	-16.16	19.85	-2.03**	1.06	47.06
24	-31.06	15.62	-4.99***	-1.21	53.59	-37.97	14.65	-5.16***	-0.99	53.90	-17.05	17.59	-2.10**	-0.66	52.94
25	-32.15	23.77	-5.06***	-2.32**	57.00	-40.75	15.23	-5.35***	-2.44**	58.87	-14.54	35.67	-1.69*	-0.65	53.03
26	-33.34	15.81	-5.14***	-1.47	53.62	-41.84	15.22	-5.39***	-1.06	54.61	-15.95	17.11	-1.80*	-1.07	51.52
27	-34.63	14.87	-5.24***	-1.46	55.56	-43.07	15.1	-5.44***	-1.10	53.90	-17.37	14.49	-1.91*	-1.02	59.09
28	-34.7	18.11	-5.12***	-0.78	52.17	-42.32	19.02	-5.12***	-0.45	51.77	-19.20	16	-2.05**	-0.62	53.03
29	-34.65	17.26	-4.98***	-1.39	57.28	-42.61	17.37	-5.04***	-1.23	56.43	-18.43	17.13	-1.93*	-0.71	59.09
30	-36.06	15.21	-5.08***	-1.86*	55.83	-44.39	13.31	-5.15***	-2.04**	56.43	-19.04	18.7	-1.95*	-0.41	54.55
31	-34.61	27.19	-4.58***	-1.15	55.61	-45.01	19.15	-5.13***	-1.95*	59.29	-13.06	39.27	-1.13	0.87	47.69
32	-34.71	14.73	-4.50***	-0.16	48.28	-44.95	14.22	-4.99***	0.20	47.14	-13.52	15.9	-1.16	-0.61	50.79
33	-35.99	19.62	-4.59***	-2.61***	60.00	-47.38	19.21	-5.14***	-2.64***	62.59	-12.17	20.45	-1.02	-0.76	54.10
34	-36.12	15.03	-4.51***	-1.26	57.29	-47.78	15.24	-5.08***	-1.28	58.27	-11.69	14.65	-0.96	-0.41	56.67
35	-34.10	14.85	-3.94***	0.61	50.51	-46.53	14.67	-4.71***	0.12	50.72	-7.89	15.21	-0.61	0.84	50.00
36	-34.05	17.82	-3.86***	-0.23	50.76	-46.84	19.97	-4.65***	-0.74	52.94	-7.00	11.6	-0.53	0.83	46.67

This table shows the CARs from a 1-month to a 36-month period after listing. The benchmark used is FF model. Brown and Warner's (1980) *t*-statistics are the two-tailed test results of a null hypothesis that means they are equal to zero. The non-parametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero. ***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2Q The equally-weighted (VW) cumulative abnormal returns for the 36 months after going public using the Fama and French three factor model benchmark

Month	Full sample					SET sample					MAI sample				
	FFCAR (%)	Std.	t-stat	Wilcoxon	%AR<0	FFCAR (%)	Std.	t-stat	Wilcoxon	%AR<0	FFCAR (%)	Std.	t-stat	Wilcoxon	%AR<0
1	1.59	18.22	4.80***	-4.42***	67.40	1.98	17.64	4.97***	-3.30***	65.99	-6.65	26.51	-6.11***	-3.01***	70.00
2	-0.75	15.24	-1.12	-2.14**	61.23	-0.57	14.86	-0.74	-1.71*	61.90	-4.44	21.35	-2.70***	-1.29	60.00
3	-2.46	11.76	-2.72***	-1.15	55.07	-2.36	11.69	-2.30**	-0.94	54.42	-4.55	13.14	-2.26**	-1.05	56.25
4	-2.83	12.06	-2.72***	-1.09	54.67	-2.72	11.51	-2.29**	-0.90	53.06	-5.26	20.44	-2.25**	-0.76	57.69
5	-1.59	12.19	-1.21	-0.32	52.00	-1.51	12.16	-1.04	-0.51	51.70	-3.27	12.69	-1.19	0.42	52.56
6	-4.84	16.59	-2.58**	-1.63	53.13	-4.85	16.72	-2.41**	-1.35	54.42	-4.53	13.4	-1.49	-1.05	50.65
7	-4.34	12.04	-2.11**	-2.75	56.95	-4.34	11.95	-1.96*	-2.65***	63.01	-4.34	13.88	-1.32	-0.23	45.45
8	-5.96	11.45	-2.61**	-1.56	54.26	-6.05	11.22	-2.47**	-1.62	56.16	-3.99	15.47	-1.13	-0.21	50.65
9	-2.96	14	-1.00	-1.30	57.66	-2.98	13.99	-0.95	-0.99	57.53	-2.60	14.21	-0.68	-0.84	57.89
10	-0.33	11.95	-0.09	-1.89	59.46	-0.11	11.95	-0.03	-0.95	57.53	-4.84	10.95	-1.16	-1.95	63.16
11	-1.25	11.9	-0.33	-1.55	56.36	-1.01	11.85	-0.25	-1.15	54.79	-6.23	13.03	-1.41	-1.39	59.46
12	-1.64	10.94	-0.42	-2.44**	55.96	-1.42	10.76	-0.34	-2.12**	56.94	-6.23	14.19	-1.35	-1.39	54.05
13	-3.24	11.36	-0.79	-3.30***	61.01	-2.98	11.4	-0.69	-2.74***	61.11	-8.73	10.22	-1.74*	-1.89*	60.81
14	-3.92	9.01	-0.92	-2.00**	59.17	-3.63	8.83	-0.80	-1.63	54.86	-10.00	12.23	-1.91*	-1.53	55.41
15	-5.09	11.99	-1.15	-2.17**	54.84	-4.83	12.02	-1.03	-2.24**	58.33	-10.47	11.11	-1.93*	-0.02	47.95
16	-1.80	14.46	-0.34	-2.56**	58.53	-1.42	14.66	-0.25	-2.63***	63.19	-9.77	9.07	-1.73*	0.13	49.32
17	-3.58	9.7	-0.65	-3.89***	63.59	-3.28	9.47	-0.57	-3.99***	68.06	-9.87	13.55	-1.70*	-0.43	54.79
18	-3.62	11.48	-0.64	-3.54***	63.55	-3.23	11.51	-0.54	-2.99***	62.94	-11.84	10.67	-1.94*	-1.77*	64.79
19	-6.70	11.07	-1.09	-0.81	52.58	-6.39	11.02	-0.99	-0.54	53.85	-13.32	11.96	-2.10**	-0.43	50.00
20	-2.90	15.34	-0.41	-2.71***	59.72	-2.33	15.47	-0.31	-2.18**	59.15	-14.85	10.98	-2.25**	-1.65*	60.87
21	-8.64	11.16	-1.04	-4.59***	64.76	-8.27	11.1	-0.95	-4.42***	65.96	-16.46	11.68	-2.41**	-1.48	62.32
22	-10.25	11.6	-1.19	-2.60***	60.48	-9.99	11.39	-1.11	-2.75***	63.12	-15.60	15.17	-2.21**	0.06	55.07
23	-15.11	11.82	-1.59	-0.70	53.11	-15.35	10.96	-1.53	-1.34	56.03	-9.78	20.87	-1.12	1.11	47.06
24	-15.69	10.84	-1.62	-0.67	53.59	-15.95	10.64	-1.55	-0.40	53.90	-10.22	14.52	-1.14	-0.61	52.94
25	-17.34	14.14	-1.74*	-2.57**	57.00	-17.69	13.79	-1.68*	-2.60***	58.87	-9.81	20.11	-1.07	-0.68	53.03
26	-20.94	14.61	-1.99**	-1.48	53.62	-21.36	14.63	-1.92*	-1.09	54.61	-12.00	13.95	-1.27	-1.08	51.52
27	-14.11	23	-1.13	-1.39	55.56	-14.19	23.34	-1.08	-1.22	53.90	-12.38	11.89	-1.28	-0.84	59.09
28	-14.53	13.76	-1.14	-0.45	52.17	-14.59	13.77	-1.09	-0.15	51.77	-13.28	13.62	-1.35	-0.67	53.03
29	-8.94	18.77	-0.63	-1.80*	57.28	-8.71	18.9	-0.59	-1.48	56.43	-13.88	14.53	-1.39	-1.14	59.09
30	-9.31	9.16	-0.65	-1.71*	55.83	-9.00	8.78	-0.60	-1.47	56.43	-15.81	15.01	-1.53	-0.62	54.55
31	-9.99	17.18	-0.69	-1.35	55.61	-9.87	16.73	-0.64	-1.61	59.29	-12.51	24.43	-1.14	0.66	47.69
32	-9.84	11.07	-0.66	-0.16	48.28	-9.71	10.94	-0.62	-0.16	47.14	-12.58	13.55	-1.13	-0.50	50.79
33	-11.19	14.44	-0.74	-2.60	60.00	-11.17	14.2	-0.70	-2.37	62.59	-11.51	18.7	-1.01	-0.77	54.10
34	-12.59	13.21	-0.82	-1.55	57.29	-12.65	13.2	-0.78	-1.30	58.27	-11.44	13.38	-0.99	-0.70	55.00
35	-11.51	12.14	-0.74	-0.19	50.51	-11.59	12.16	-0.70	-0.59	50.72	-9.97	11.71	-0.84	0.65	50.00
36	-13.22	15.08	-0.83	-0.41	50.76	-13.47	15.26	-0.81	-0.95	52.94	-7.88	9.98	-0.64	1.17	46.67

This table shows the CARs from a 1-month to a 36-month period after listing. The benchmark used is FF model. Brown and Warner's (1980) *t*-statistics are the two-tailed test results of a null hypothesis that means they are equal to zero. The non-parametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero. ***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2R The equally-weighted (EW) cumulative abnormal returns for the 36 months after going public using the Size Decile (SD) model benchmark

Month	Full sample					SET sample					MAI sample				
	SDCAR (%)	Std.	*t*-stat	Wilcoxon	%AR<0	SDCAR (%)	Std.	*t*-stat	Wilcoxon	%AR<0	SDCAR (%)	Std.	*t*-stat	Wilcoxon	%AR<0
1	-5.84	23.46	-6.58***	-4.88***	67.84	-5.97	19.57	-6.85***	-3.73***	66.67	-5.60	29.44	-6.04***	-3.13***	70.00
2	-5.80	19.19	-4.58***	-4.27***	63.44	-6.84	17.63	-5.55***	-3.30***	61.22	-3.88	21.78	-2.80***	-2.69***	67.50
3	-6.55	15.4	-4.23***	-4.06***	65.20	-6.80	16.5	-4.44***	-3.23***	65.31	-6.11	13.09	-3.38***	-2.43**	65.00
4	-6.13	19.76	-3.36***	-3.67***	64.89	-6.61	18.95	-3.67***	-3.06***	63.27	-5.23	21.29	-2.48**	-2.03**	67.95
5	-7.38	14.86	-3.59***	-3.68***	66.22	-9.56	15.49	-4.41***	-3.45***	67.35	-3.27	13.1	-1.31	-1.56	64.10
6	-7.23	15.9	-3.19***	-3.63***	62.05	-8.83	17.13	-3.59***	-3.25***	63.27	-4.25	13.3	-1.54	-1.71*	59.74
7	-9.03	14.41	-3.60***	-3.77***	63.23	-10.57	14.67	-3.93***	-3.44***	65.07	-6.15	13.99	-2.00**	-1.70*	59.74
8	-8.73	14.39	-3.21***	-3.43***	60.99	-10.61	15.26	-3.66***	-3.16***	64.38	-5.23	12.65	-1.57	-1.33	54.55
9	-8.95	16.16	-3.10***	-3.28***	62.16	-10.68	17.47	-3.45***	-3.00***	65.75	-5.72	13.44	-1.62	-1.34	55.26
10	-8.64	18.59	-2.80***	-3.17***	57.66	-8.73	21	-2.43**	-2.52**	60.27	-8.56	12.27	-2.14**	-1.78*	52.63
11	-8.54	14.45	-2.62***	-3.00***	61.36	-8.51	15.05	-2.23**	-2.25**	62.33	-8.71	13.28	-2.07**	-1.94**	59.46
12	-9.69	13.76	-2.83***	-3.23***	62.84	-9.23	14.05	-2.32**	-2.42**	63.19	-10.67	13.23	-2.36**	-2.11**	62.16
13	-11.21	12.82	-3.11***	-3.59***	62.84	-10.89	13.44	-2.61**	-2.74***	63.19	-11.92	11.62	-2.51***	-2.33**	62.16
14	-12.75	10.62	-3.37***	-4.00***	64.22	-12.61	10.99	-2.89***	-3.05***	63.89	-13.12	9.93	-2.64**	-2.50**	64.86
15	-13.18	11.21	-3.36***	-4.00***	62.21	-13.77	11.28	-3.04***	-3.16***	61.11	-12.13	11	-2.33**	-2.46**	64.38
16	-15.19	11.76	-3.65***	-4.20***	63.13	-17.09	12.03	-3.44***	-3.50***	63.89	-11.55	10.83	-2.14**	-2.28**	61.64
17	-16.62	13.96	-3.84***	-4.31***	63.13	-19.81	13.06	-3.74***	-3.82***	63.19	-10.38	15.37	-1.84*	-1.98**	63.01
18	-18.55	10.87	-4.07***	-4.60***	65.42	-22.28	10.68	-4.00***	-4.24***	68.53	-11.24	11.23	-1.93***	-1.89*	59.15
19	-18.93	12.3	-4.04***	-4.70***	65.26	-21.59	11	-3.70***	-4.11***	67.13	-13.8	14.46	-2.21**	-2.36**	61.43
20	-21.4	10.66	-4.27***	-5.25***	67.30	-23.95	10.38	-3.93***	-4.50***	68.31	-16.51	11.28	-2.46**	-2.68***	65.22
21	-22.92	11.84	-4.42***	-5.25***	67.14	-25.11	12.21	-4.01***	-4.50***	67.38	-18.75	11.08	-2.66***	-2.62***	66.67
22	-24.82	11.6	-4.59***	-5.37***	66.67	-27.57	11.4	-4.22***	-4.58***	68.09	-19.51	12.01	-2.69***	-2.75***	63.77
23	-24.19	13.81	-4.31***	-5.23***	67.46	-27.90	11.79	-4.17***	-4.59***	68.09	-16.91	17.19	-2.19**	-2.49**	66.18
24	-24.83	13.4	-4.33***	-5.32***	66.03	-28.69	13.89	-4.20***	-4.58***	65.96	-17.21	12.41	-2.18**	-2.66***	66.18
25	-24.50	21.25	-4.15***	-5.20***	67.63	-29.85	12.88	-4.27***	-4.78***	68.79	-13.71	32.53	-1.59	-2.20**	65.15
26	-24.93	13.65	-4.14***	-5.21***	64.73	-30.00	13.08	-4.20***	-4.77***	67.38	-14.75	14.88	-1.67*	-2.16**	59.09
27	-25.57	13.18	-4.16***	-5.20***	63.77	-30.50	13.17	-4.19***	-4.78***	65.25	-15.68	13.31	-1.74*	-2.18**	60.61
28	-24.99	14.61	-3.94***	-5.07***	63.29	-29.50	16.24	-3.88***	-4.60***	65.25	-16.00	10.37	-1.74*	-2.23**	59.09
29	-24.85	15.64	-3.83***	-5.08***	64.56	-29.37	16.37	-3.78***	-4.66***	66.43	-15.81	14.09	-1.69*	-2.13**	60.61
30	-26.14	14	-3.94***	-5.12***	61.65	-30.43	12.84	-3.84***	-4.62***	62.86	-17.58	16.29	-1.82*	-2.26**	59.09
31	-24.40	25.55	-3.44***	-4.67***	60.49	-30.79	15.86	-3.82***	-4.49***	62.86	-11.26	38.96	-0.97	-1.72*	55.38
32	-23.52	12.13	-3.20***	-4.61***	60.59	-29.88	11.47	-3.58***	-4.30***	62.14	-10.46	13.58	-0.89	-1.86*	57.14
33	-23.93	18.29	-3.21***	-4.79***	63.00	-31.10	17.64	-3.66***	-4.52***	65.47	-9.03	19.71	-0.75	-1.90*	57.38
34	-23.17	13.22	-3.02***	-4.64***	62.81	-30.75	12.48	-3.54***	-4.42***	64.75	-7.32	14.85	-0.59	-1.708*	58.33
35	-22.17	11.12	-2.79***	-4.49***	61.62	-29.90	10.86	-3.33***	-4.38***	65.22	-5.95	11.78	-0.47	-1.45	53.33
36	-21.25	15.5	-2.59**	-4.34***	60.41	-29.29	17.28	-3.18***	-4.29***	63.24	-4.32	10.44	-0.33	-1.23	55.00

This table shows the CARs from a 1-month to a 36-month period after listing. The benchmark used is SD model. Brown and Warner's (1980) *t*-statistics are the two-tailed test results of a null hypothesis that means they are equal to zero. The non-parametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero. ***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Table 2S The value-weighted (VW) cumulative abnormal returns for the 36 months after going public using the Size Decile (SD) model benchmark

Month	Full sample					SET sample					MAI sample				
	SDCAR (%)	Std.	*t*-stat	Wilcoxon	%AR<0	SDCAR (%)	Std	*t*-stat	Wilcoxon	%AR<0	SDCAR (%)	Std.	*t*-stat	Wilcoxon	%AR<0
1	-0.46	17.38	-10.16***	-4.37***	67.84	-0.19	16.77	-23.93***	-3.16***	66.67	-6.2	26.59	-6.06***	-3.22***	70.00
2	-1.40	17.4	-7.39***	-3.55***	63.44	-1.32	17.15	-5.89***	-2.86***	61.22	-2.93	21.76	-1.76*	-2.45**	67.50
3	-3.86	12.33	-5.48***	-3.23***	65.20	-3.89	12.3	-5.20***	-2.55***	61.90	-3.22	12.75	-1.58	-1.84*	65.00
4	-5.65	14.57	-5.78***	-3.03***	64.89	-5.80	14.19	-5.58***	-2.53***	63.27	-2.50	20.98	-1.05	-1.57	67.95
5	-9.06	14.37	-5.54***	-3.33***	66.22	-9.52	14.4	-5.38***	-3.12***	67.35	0.54	12.11	0.18	-0.91	64.10
6	-10.06	12.43	-5.52***	-3.16***	62.05	-10.55	12.39	-5.36***	-2.94***	63.27	0.21	13.25	0.06	-0.97	59.74
7	-12.07	11.62	-5.67***	-3.37***	63.23	-12.6	11.53	-5.52***	-3.11***	65.07	-0.77	13.45	-0.22	-0.92	59.74
8	-10.65	11.27	-4.43***	-3.24***	60.99	-11.17	11.19	-4.36***	-3.10***	64.38	0.35	12.67	0.09	-0.36	54.55
9	-9.09	14.47	-3.36***	-3.31***	62.16	-9.54	14.5	-3.32***	-3.15***	65.75	0.46	13.58	0.11	-0.48	55.26
10	-6.81	11.88	-2.17**	-2.73***	57.66	-7.12	11.91	-2.13**	-2.58***	60.27	-0.29	10.88	-0.06	-0.83	52.63
11	-6.79	11.41	-2.06**	-3.18***	61.36	-7.05	11.45	-2.01**	-2.77***	62.33	-1.33	10.66	-0.29	-1.35	59.46
12	-7.48	10.81	-2.16**	-3.15***	62.84	-7.73	10.74	-2.10**	-2.55***	63.19	-2.31	12.17	-0.49	-1.50	62.16
13	-9.84	10.7	-2.57**	-3.40***	62.84	-10.14	10.7	-2.50**	-2.84***	63.19	-3.54	10.63	-0.72	-1.84*	62.16
14	-10.18	8.98	-2.56**	-3.71***	64.22	-10.42	8.99	-2.48**	-3.16***	64.58	-5.1	8.68	-0.98	-2.17**	64.86
15	-9.28	9.81	-2.22**	-3.58***	62.21	-9.45	9.84	-2.14**	-2.99***	61.11	-5.76	9.17	-1.07	-2.25**	64.38
16	-10.59	8.43	-2.42**	-3.66***	63.13	-10.86	8.4	-2.34**	-3.16***	63.89	-4.94	8.91	-0.88	-1.90*	61.64
17	-15.64	10.62	-2.77***	-4.10***	63.13	-16.13	10.52	-2.71***	-3.70***	63.19	-5.41	11.7	-0.94	-1.76*	63.01
18	-12.37	13.81	-1.95*	-4.27***	65.42	-12.69	13.95	-1.90*	-3.88***	68.53	-5.76	9.54	-0.97	-1.43	59.15
19	-11.86	8.14	-1.82*	-4.24***	65.26	-12.05	7.91	-1.75*	-3.75***	67.13	-7.81	11.7	-1.25	-1.73*	61.43
20	-11.27	10.88	-1.68*	-4.75***	67.30	-11.32	10.9	-1.60	-4.12***	68.31	-10.18	9.98	-1.53	-2.17**	65.22
21	-13.13	9.66	-1.87*	-4.99***	67.14	-13.25	9.62	-1.79*	-4.40***	67.38	-10.68	10.32	-1.57	-2.46**	66.67
22	-15.43	11.14	-2.10**	-4.99***	66.67	-15.66	11.12	-2.02**	-4.40***	68.09	-10.63	11.17	-1.53	-2.23**	63.77
23	-17.98	8.61	-2.32**	-4.91***	67.46	-18.51	7.72	-2.25**	-4.40***	68.09	-6.76	18.4	-0.86	-2.20**	66.18
24	-20.77	8.46	-2.53**	-4.65***	66.03	-21.40	8.38	-2.46**	-4.20***	65.96	-7.49	9.63	-0.93	-2.31**	66.18
25	-19.53	16.74	-2.30**	-4.90***	67.63	-20.19	16.67	-2.26**	-4.44***	68.79	-5.66	18.14	-0.67	-2.17**	65.15
26	-19.49	9.18	-2.25**	-4.56***	64.73	-20.05	8.99	-2.20**	-4.20***	67.38	-7.5	12.4	-0.87	-1.79*	59.09
27	-13.44	24.38	-1.29	-4.33***	63.77	-13.66	24.78	-1.24	-4.04***	65.25	-8.69	11.14	-0.98	-1.80*	60.61
28	-15.69	12.3	-1.46	-4.45***	63.29	-16.03	12.39	-1.41	-4.19***	65.25	-8.58	9.99	-0.95	-1.68*	59.09
29	-10.73	16	-0.90	-4.45***	64.56	-10.8	16.15	-0.86	-4.28***	66.43	-9.43	10.63	-1.02	-1.66*	60.61
30	-9.59	9.97	-0.79	-4.34***	61.65	-9.42	9.76	-0.73	-4.14***	62.86	-13.25	12.71	-1.33	-1.71*	59.09
31	-8.73	12.69	-0.70	-3.92***	60.49	-8.71	11.88	-0.66	-3.89***	62.86	-9.36	23.98	-0.86	-1.12	55.38
32	-9.42	9.39	-0.74	-3.89***	60.59	-9.45	9.28	-0.71	-3.94***	62.14	-8.84	11.32	-0.80	-1.22	57.14
33	-8.94	11.54	-0.69	-4.34***	63.00	-8.98	11.19	-0.66	-4.20***	65.47	-7.97	17.32	-0.71	-1.36	57.38
34	-8.28	10.65	-0.63	-4.28***	62.81	-8.32	10.49	-0.60	-4.13***	64.75	-7.49	13.54	-0.65	-1.39	58.33
35	-7.90	8.96	-0.59	-3.99***	61.62	-7.95	8.96	-0.56	-3.95***	65.22	-7.04	9.04	-0.60	-0.86	53.33
36	-6.94	13.97	-0.51	-3.97***	60.41	-7.00	14.2	-0.49	-4.13***	63.24	-5.49	7.63	-0.46	-0.81	55.00

This table shows the CARs from a 1-month to a 36-month period after listing. The benchmark used is SD model. Brown and Warner's (1980) *t*-statistics are the two-tailed test results of a null hypothesis that means they are equal to zero. The non-parametric Wilcoxon Signed Rank test is used to test the null hypothesis that the median abnormal return is zero. ***, ** and * indicate statistical significance at the 1, 5 and 10% levels respectively.

Appendix 2B A List of Figures for Long-Run Performance of IPOs

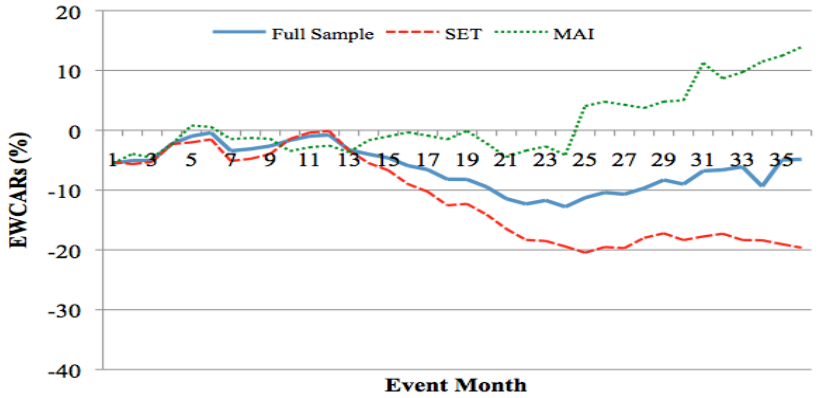


Figure 2A Long-run performance of Thai IPOs 2001-2012 using an Equally-Weighted Cumulative Abnormal return (EWCAR)

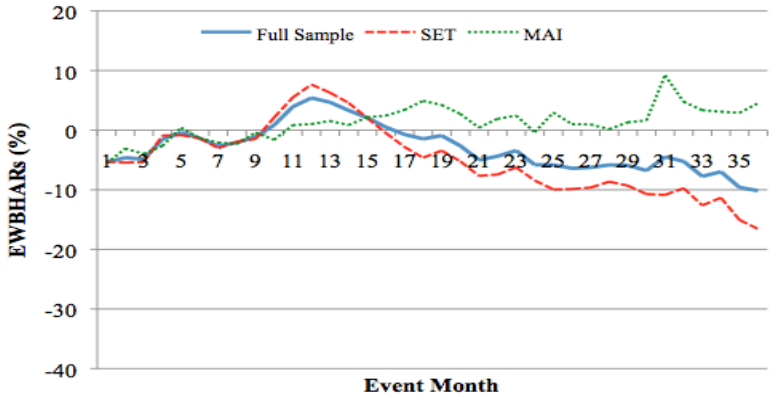


Figure 2B Long-run performance of Thai IPOs 2001-2012 using Equally-Weighted Buy-and-Hold abnormal return (EWBHAR)

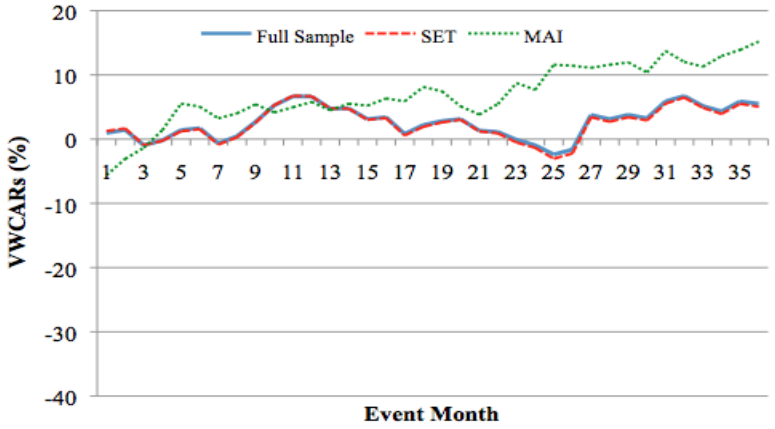


Figure 2C Long-run performance of Thai IPOs 2001-2012 using Value-Weighted Cumulative Abnormal return (VWCAR)

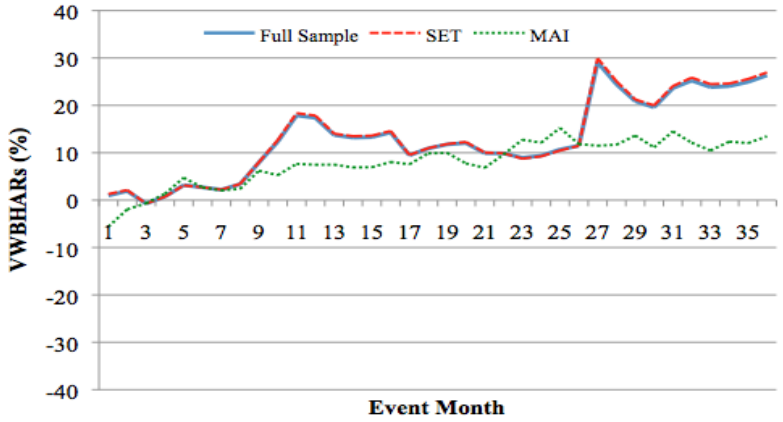


Figure 2D Long-run performances of Thai IPOs 2001-2012 using Value-Weighted Buy-and-Hold abnormal return (VWBHAR)

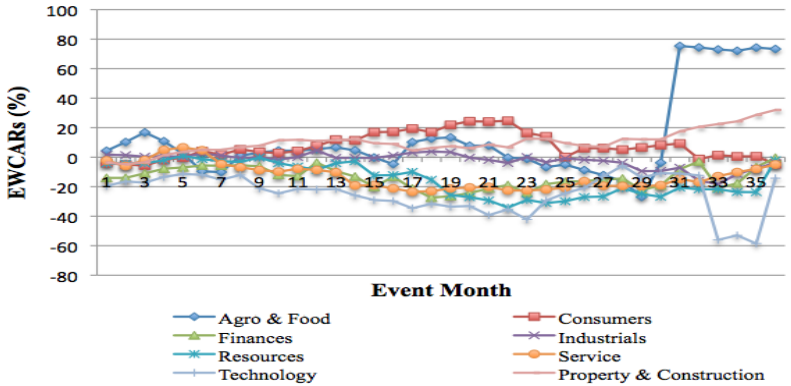


Figure 2E Long-run performance of Thai IPOs 2004-2012 categorized into 8 sectors by using Equally-Weighted Cumulative Abnormal returns (EWCARs)

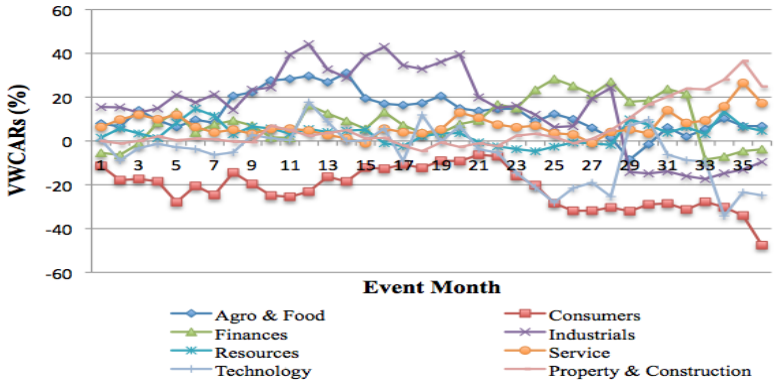


Figure 2F Long-run performance of Thai IPOs 2004-2012 categorised into 8 sectors by using Value-Weighted Cumulative Abnormal returns (VWCARs)

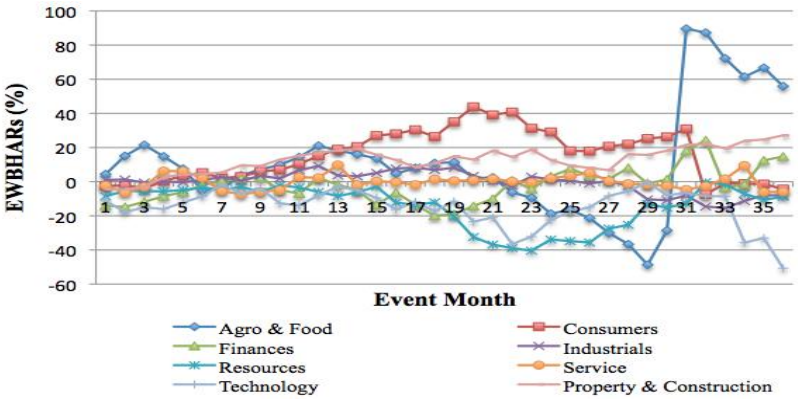


Figure 2G Long-run performance of Thai IPOs 2004-2012 categorized into 8 sectors by using Equally-Weighted buy-and-hold abnormal returns (EWBHARs)

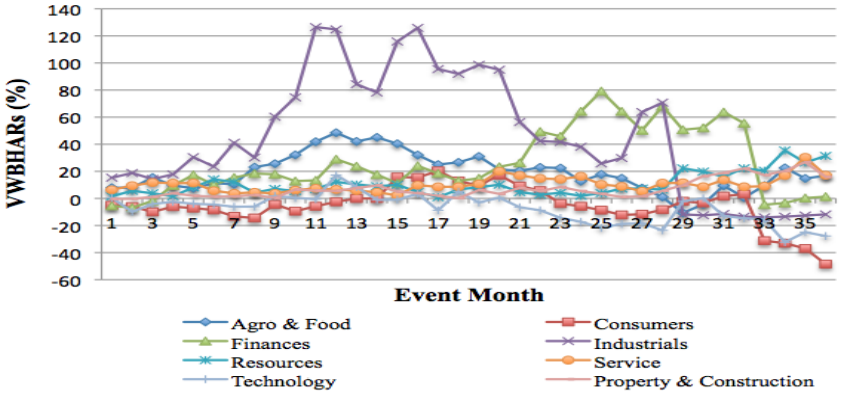


Figure 2H Long-run performance of the 227 Thai IPOs 2001-2012 categorized into 8 sectors by using Value-Weighted buy-and-hold abnormal returns (VWBHARs)

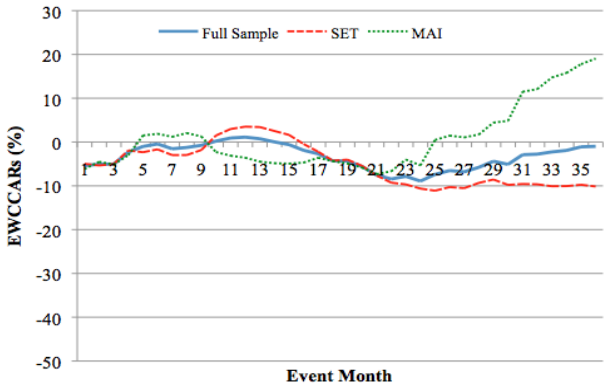


Figure 2I Long-run performance of Thai IPOs 2001-2012 using an Equally-Weighted Cumulative Abnormal return (EWCCAR) by CAPM benchmark

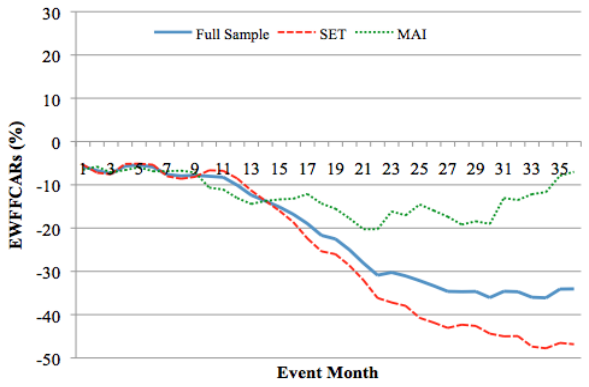


Figure 2J Long-run performance of Thai IPOs 2001-2012 using an Equally-Weighted Cumulative Abnormal return (EWFFCAR) by FF model benchmark

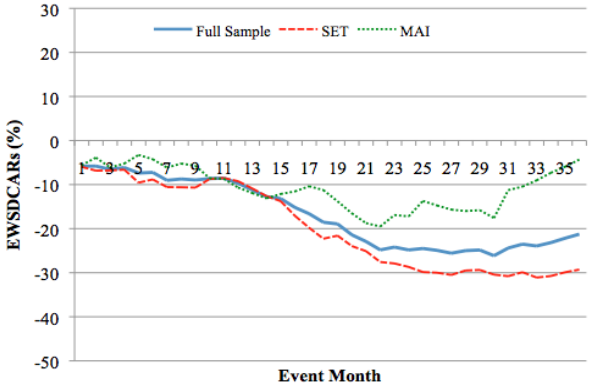


Figure 2K Long-run performance of Thai IPOs 2001-2012 using an Equally-Weighted Cumulative Abnormal return (EWSDCAR) by SD model benchmark

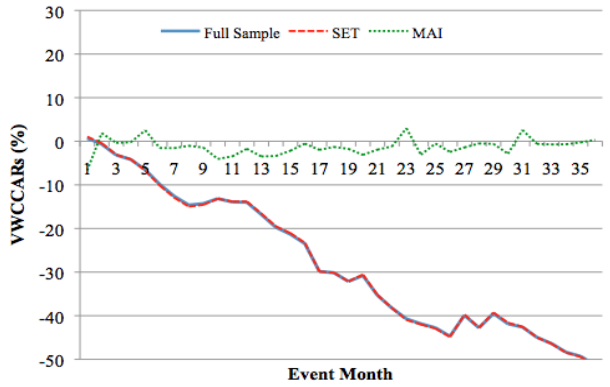


Figure 2L Long-run performance of Thai IPOs 2001-2012 using a Value-Weighted Cumulative Abnormal return (VWCCAR) by CAPM benchmark

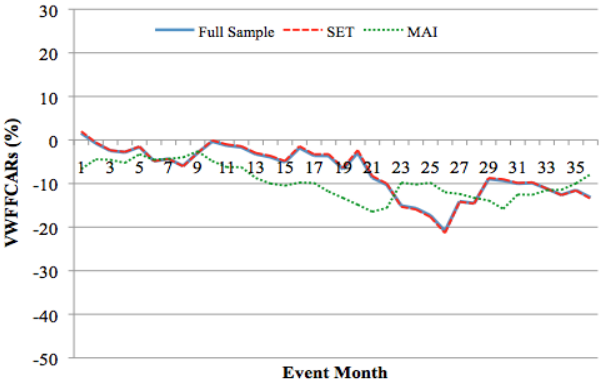


Figure 2M Long-run performance of Thai IPOs 2001-2012 using a Value-Weighted Cumulative Abnormal return (VWFFCAR) by FF model benchmark

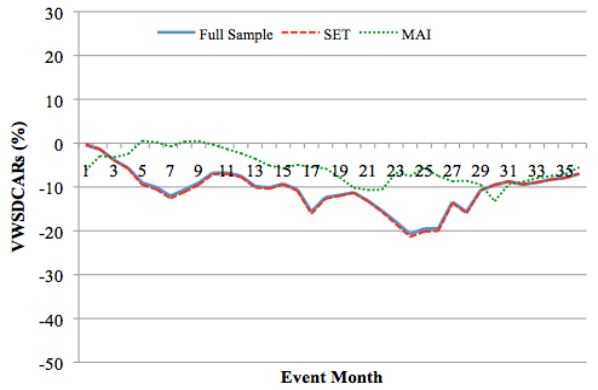


Figure 2N Long-run performance of Thai IPOs 2001-2012 using a Value-Weighted Cumulative Abnormal return (VWSDCAR) by SD model benchmark

CHAPTER 3

ENDOGENOUS DISCLOSURE OF USE-OF-PROCEEDS AND PERFORMANCE OF IPOs

Chapter 3

Endogenous Disclosure of Use-of-Proceeds and Performance of IPOs

3.1 Introduction

Many theoretical and empirical works suggest that companies may decrease the cost of capital by reducing information asymmetry or by increasing voluntary disclosure[27]. Recently, a number of authors have concentrated on the role of information disclosures in IPO prospectuses on the IPO pricings (e.g., Ljungqvist and Wilhelm, 2003; Leone *et al*., 2007; Wyatt, 2014; Nielsen *et al*., 2015).

Under the Securities and Exchange Commission (SEC)'s rules and regulations, when a firm issues an IPO, they have to disclose the intended uses of IPO proceeds in the prospectus. However, the issuers have considerable latitude with respect to the level or amount of information they would like to provide to the public. A related strand of literature focused on explaining why companies choose to disclose more information than is required by regulation from an information-economics perspective (Jenkinson and Ljungquist, 2001). For companies that have not been previously publicly traded and are unknown to the stakeholders (i.e. investors and analysts), the rationale for a detailed disclosure during the IPO phase is to help investors to build up their knowledge of the company and reduce information asymmetry and the *ex-ante* uncertainty regarding the value of their shares, as well as the extent of IPO underpricing. Obviously, the potential drawbacks of a detailed disclosure can restrict their flexibility over how to spend the money, or may release proprietary information (e.g., Dye, 2001; Healy and Palepu, 2001; Leone *et al*., 2007). In this chapter, the author builds on this literature and empirically examine the impact of endogenous disclosure on the stock market performance of IPO firms listed in Thailand as well as measuring and interpreting the information contained in Thai IPO prospectus texts and files.

[27] See Chahine and Filatochev, 2008; Diamond and Verrecchia, 1991; Healey and Palepu, 2001; Leone *et al*., 2007; Ljungqvist and Wilhelm, 2003; Schrand and Verrecchia, 2002; and among others.

This chapter mainly aims to examine the effects of the levels of the intended use-of-proceeds disclosures, the use-of-proceeds purposes, and information asymmetry on IPO underpricing and the long-run performance of IPOs.

The remainder of this chapter consists of five sections. Section 3.2 gives an overview of the existing literature on the endogenous disclosure of intended use-of-proceeds relevant to this study. Data and methodology are explained in Section 3.3, while the empirical results and a discussion of the findings are provided in Section 3.4. Robustness checks are reported in Section 3.5. Section 3.6 then concludes this chapter.

3.2 Literature Review and Hypothesis Development

There is considerable empirical evidence showing that IPOs were generally underpriced (Jelic *et al*., 2001; Ritter and Welch, 2002; Lyn and Zychowicz, 2003; Burrowes and Jones, 2004; Chen *et al*., 2004; Chi and Padgett, 2005; Kirkulak and Davis, 2005; Bayley *et al*., 2006; Yu and Tse, 2006; Guo and Brooks, 2008; Bradley *et al*., 2009; Gao, 2010; Dimovski *et al*., 2011; Costa *et al*., 2013 and among others). Notably, for emerging markets, the IPO underpricing was much more severe compared to the developed markets (Costa *et al*., 2013)[28]. However, most of the prior empirical studies have found that IPOs show underperformance in the long-run or have negative abnormal returns over different holding periods after the IPO issue date (Ritter, 1991; Kooli and Suret, 2004; Álvarez and González, 2005; Akhigbe *et al*., 2006; Mazouz *et al*., 2008; Su and Bangassa, 2011; Thomadakis *et al*., 2012; Wen and Cao, 2013; Agathee *et al*., 2014). This remarkable empirical evidence from considerable theoretical literature in previous decades is trying to rationalize why IPOs are underpriced. Information asymmetry[29] is one of the well-known key reasons for explaining the IPO underpricing phenomenon[30] (Ritter and Welch, 2002; Ljungqvist, 2007). Much research focuses on the factors affecting the stock market performance of IPO companies[31]. Typical explanatory factors of IPO performance include underwriters' reputation (Beatty and Ritter, 1986; Carter *et al*., 1998; Jelic *et al*.,

[28] In a recent study, Costa *et al*. (2013) have analyzed the impact of six fundamental cultural dimensions on IPO underpricing and used a huge IPO data set from 39 countries. Their results showed an average initial return of 27.6%. The Chinese IPO is the most severely underpriced or 156.1%. In the Russia, however, the IPO underpricing is smallest at merely 4.2%.

[29] Asymmetric information models assume that one of issuers, underwriters, marketing the deal and investors knows more than others.

[30] IPO underpricing is the phenomenon where the pricing of IPO is lower than the market value.

[31] See Arthurs *et al*., 2009; Bessler and Bittelmeyer, 2008; Chen *et al*., 2004; Durukan, 2002; Guo *et al*., 2004; Brooks, 2008; Kenourgios *et al*., 2007; Lowry and Shu, 2002; Su and Bangassa, 2011;Thomadakis *et al*., 2012; Wen and Cao, 2013; among others.

2001; Kirkulak and Davis, 2005; Kenourgios *et al*., 2007; Kirkulak and Davis, 2005; Dimovski, *et al*., 2011; Su and Bangassa, 2011), ownership structure (Chen *et al*, 2004; Su, 2004; Ahmad *et al*., 2011), and culture differences (Costa *et al*., 2013). However, these factors have been left outside the scope of this chapter as the author focuses here on the effects of disclosing use-of-proceeds information on information asymmetries. Schrand and Verrechia (2004) argue that information asymmetry between corporate management and the financial markets at the time of the IPO leads to higher costs of capital. They argue that companies can directly apply voluntary disclosure as a tool to reduce these costs. Further, they find disclosure to be negatively associated with bid–ask spread as a proxy for a company's cost of capital.

The seminal literature related to the concept of information disclosure suggested that voluntary disclosures are expected to lower the cost of equity capital (see Verrecchia, 2001) because increased disclosure reduces information asymmetry and tends to enhance stock market liquidity by exceeding demand for a firm's stocks. This, in turn, may facilitate a more precise valuation of the company. Both Botosan (1997) and Richardson and Welker (2001) confirm that there is a negative relationship between the quantity and quality of information disclosure and the firms' cost of equity capital. In the same vein, information can reduce investors' perceived risk when predicting a firm's future performance (Nielsen et al., 2015). In the recent study of Andriansyah and Messinis (2016), they investigated the relation between the use-of-proceeds and the operating performance in the Indonesian IPO market. They classified motivation for the IPO issue into 5 groups such as fixed assets investment, working capital financing, investment in shares of stock, debt repayments, and secondary shares and suggested that this led the companies that used the proceeds for investment in fixed assets and in stock market shares to a better operating performance but other usages led to a poor performance. An important subset of this research suggests the existence of information asymmetries between the IPO's firm, underwriters, and external investors that in itself creates a set of agency costs impacting on IPO pricing and long-run abnormal return after going public. This chapter is related to the following four strands of literature on the performance of IPOs: 1) Intended use-of-proceeds disclosure and cost of capital; 2) Use-of-proceeds purposes and IPO performance; 3) *Ex-ante* uncertainty, information disclosure and IPO discount; 4.) Signalling and Impresario hypotheses for IPOs. The following sections also suggest a number of testable hypotheses.

3.2.1 Intended Use-of-Proceeds Disclosure and IPO Underpricing

A number of scholars focused on examining the level/amount and number of use-of-proceeds disclosures on the stock market performance of IPOs. For instance, Jenkinson and Ljungquist (2001)'s study was among the first to show how lower information asymmetry via improved information disclosure became proxies for reducing *ex-ant*e uncertainty. Furthermore, Ljungqvist and Wilhelm (2003) suggest that new issuers disclosing vague information about the use-of-proceeds show a higher IPO discount rate. However, the literature provides mixed findings concerning the roles of information disclosure in the use-of-proceeds section in prospectuses. For example, Beatty and Ritter (1986) found a positive relation between the numbers of use-of-proceeds and underpricing. Leone *et al*. (2007) examined the specificity of the use-of-proceeds in the IPO prospectus and found that an increase in specificity was associated with a decline in underpricing. This is in line with Schrand and Verrecchia (2002), who also suggested that an increase in disclosure was negatively correlated with IPO underpricing. In the same vein, Ljungqvist and Wilhelm (2003) showed that firms citing the funding of operating expenses (less specificity) as the primary use have higher underpricing. Companies may try to reduce information asymmetries at the time of their IPOs by disclosing strategic information such as operations, acquisition strategy, finance and the like, in the prospectuses (Schrand and Verrecchia, 2002; Healey and Palepu, 2001; Chahine and Filatochev, 2008). However, Beatty and Welch (1996) found no relationship between the number of uses of IPO proceeds and subsequent initial returns. Another vital aspect of the disclosure of intended use-of-proceeds and the stock market performance of IPOs relates to the details in the use-of-proceeds disclosure and their impact on IPOs' underpricing. Thus, previous voluntary disclosure studies imply that information disclosure reduces the cost of equity capital, especially when there is a large information asymmetry in the IPO process because IPO companies can reduce 'money left on the table' by setting up a higher offering price and also can use the proceeds for their own purposes (e.g. fixed assets investment, working capital financing, research and development, investment in shares of stock, debt repayments and so on).

In addition, a recent study by Nielsen *et al*. (2015) studied the effects of the disclosure practices in Japanese IPO prospectuses on long-term stock performance. They found that intellectual capital information leads to a significantly better long-term performance. In another study, Bessler and Bittelmeyer (2008) found that innovation, patents, and

intellectual capital are important factors that have a positive impact on the valuation and on the long-run financial performance of especially young technology firms.

Based on the above discussions, it can be expected that companies that disclose substantial amounts of information on use-of-proceeds will reduce the cost of equity and will be associated with better transparency and therefore also have a better long-term performance. The hypotheses can be stated as follows:

H1.1 *The level of intended use-of-IPO proceeds disclosure has a negative impact on IPO underpricing, ceteris paribus.*

H1.2 *The level of intended use-of-IPO proceeds disclosure has a positive impact on firms' long-term performance of the stock price, ceteris paribus.*

3.2.2 Use-of-Proceeds Purposes and IPO Performance

Companies raise external equity capital for different reasons. One of the basic tenets of financial theory is that companies with potentially value-adding investment projects have inadequate internal funds to finance the projects. Therefore, they should raise external capital to invest and expand. The stock markets play a significant role for companies enabling them to offer shares and use the proceeds for investment purposes, such as capital expenditure, research and development, acquisition, and for other purposes. On the other hand, firms can issue equity and use the proceeds to repay debt obligations (recapitalization). However, Wyatt (2014) argued that designating the use-of-proceeds for working capital, in cases of companies that conceal specific information about capital expenditure, is an opaque disclosure (*ceteris paribus*).

In this section, the author discusses the literature on a variety of use-of-proceeds purposes affecting IPO underpricing and long-run performance differently. According to Wyatt (2014), using proceeds to pay off their own loans is a negative signal that may increase the *ex-ante* uncertainty of their offerings and the subsequent uncertainty associated with expected future cash flows. Pagano *et al*. (1998) and Leone *et al*. (2007) showed that firms using the proceeds for repaying debt tend to be large and mature companies with growth opportunities and companies that are going public to exploit mispricing.

Furthermore, firms stating their use-of-proceeds to be for debt repayment may take advantage of overvalued stocks by timing IPOs to be during periods of high returns to pay off their debts (Autore *et al*., 2009). As a consequence, they are more likely to underperform in the long-run. The conflicts of interest effect is a well-known concept explaining the return around the offering announcement and the post-performance of issuers underwritten by the bank and the stated intended use-of-proceeds for debt repayment. This effect suggests that a bank underwriter with superior information about an issuing company can misrepresent the true value of stocks and require the issuer to use the proceeds to pay off its loan (Benston, 1990). In a recent study, Suzuki and Yamada (2012) find that firms underwritten by the bank have higher returns at the SEO announcement in Japan. Additionally, they report that firms that stated their intended use-of-proceeds to be to repay bank loans underwritten by investment houses have lower returns compared with their matching portfolios.

On the other hand, for companies stating investment as the intended use-of-proceeds were able to signal their future investment opportunities better (Autore *et al*., 2009; Hertzel and Li, 2007). Hence, they should not be expected to be underperforming in the long-run. In contrast, Jeanneret (2005) studied the relationship between the long-term performance of French SEOs and their intended use-of-proceeds. He found that firms that stated their use-of-proceeds to be for investment underperform in the long-run and there is no abnormal performance for firms, the stated purpose of which is for recapitalization. Nevertheless, Ljungqvist and Wilhelm (2003) suggested that companies intending to use their proceeds for operating expenses rather than for investment and debt repayment are potentially more riskier. In another study, Bessler and Bittelmeyer (2008) found that innovation, patents, and intellectual capital are important factors that have a positive impact on the valuation and on the long-run financial performance of especially young technology firms.

In Thailand the companies that stated their use-of-proceeds to be for investment provide more specific information (e.g. increasing subsidiaries, expanding factories, research and development, improving service and merchandise quality and others) than companies that stated their intention was to pay off their short- or long-term debts. Accordingly, less and opaque disclosure may be associated with a high *ex-ante* uncertainty of the offer and the expected future cash flows. Thus, a positive (negative) relation is expected between the use of proceeds for repaying debt and underpricing (the aftermarket performance of IPOs).

H2.1 *The intended use-of-IPO-proceeds for repaying debt (investment) is positively (negatively) related to the magnitude of IPO underpricing, ceteris paribus.*

H2.2 *The intended use of IPO proceeds for repaying debt (investment) is negatively (positively) related to the long-run performance of IPOs, ceteris paribus.*

3.2.3 Ex-ante Uncertainty, Information Disclosure and IPO Underpricing

In an extension of Rock's (1986)[32] model of underpricing, Beatty and Ritter (1986), demonstrated that greater *ex-ante* uncertainty of a new issue was related to greater information asymmetry, which then resulted in higher underpricing. Beatty and Ritter provide further interpretation, namely following intuition. An investor who engages in information production implicitly invests in a call option on the new issues, which will be exercised if the 'true' price exceeds the strike (offering) price. They also suggested that issues that are subject to information asymmetry, such as those from a small company, will tend to be underpriced. As a result, such companies then have to face the problem of having to retain the shares themselves. Similarly, Rock (1986), Ritter (1998) and Ritter and Welch (2002) suggested that *ex-ante* uncertainty about future cash flows is related to a lower offer price than would otherwise be expected, and to more severe IPO underpricing. Thus, company characteristics, including age and size, are popular proxies of IPO underpricing (Ljungqvist, 2007). Furthermore, the findings of Chi and Padgett (2005) and Cheung *et al.* (2009), as well as the studies of Su and Bangassa (2011) and Lin and Tian (2012) also showed that the offering size or the flotation size of an IPO has a negative effect on an IPO's underpricing.

For the public information, many researchers have used the age of a firm at the time of offering a proxy for measuring the *ex-ante* uncertainty of the IPOs. In this line, the empirical evidence of Carter *et al.* (1998), Chen *et al*. (2004), Yu and Tse (2006) and Sullivan and Unite (2009) represented the offer size and age of firms as being significant and providing negative correlation in explaining IPO underpricing. They also suggested

[32] 'The 'winner's curse model' by Rock (1986) assumes that informed investors, such as issuing firms and their underwriters, have an informational advantage as compared to general and retail investors about the firms' present value and the risk of the future cash flows. Hence, informed investors invest only in attractively priced IPOs, while uninformed investors invest randomly. In order to attract less informed investors to preempt the new IPO, shares must on average be underpriced. "The uninformed compete with the informed, and the issuer must ultimately compensate them for their disadvantage" (Rock, 1986, p. 207).

that there is a lower information asymmetry for older firms due to a greater amount of public information concerning them being available. In a key study, Sullivan and Unite (1999) also found that, due to asymmetric information, IPOs of new start-up firms have been shown to be subject to greater underpricing than those of established firms. Likewise, Kirkulak and Davis (2005) suggested that younger firms have a higher *ex-ante* uncertainty. They even indicated a negative relationship between the age variable and the initial return. In addition, Diamond and Verrecchia (1991) found that large firms prefer to disclose more information since they benefit most. Disclosure reduces the risk-bearing capacity available through market-makers. If the initial information asymmetry is less, it will decrease the current price of the security.

In this chapter, the author argues that disclosing information on the offer size and age of the firm has a negative impact on uncertainties and reduces initial returns. Hence, the hypotheses can be stated as follows:

> ***H3.1*** *The information on offer size of the firm is negatively related to level of uncertainty and IPO underpricing, ceteris paribus.*

> ***H3.2*** *The information on age of the firm is negatively related to level of uncertainty and IPO underpricing, ceteris paribus.*

Furthermore, the time gap between the offer date and the first day of trading may affect the level of *ex-ante* uncertainty and IPO underpricing. The firms that have an extended period of time (from the establishment date to the IPO offer date) have less information asymmetry. This argument has been theoretically developed by Chowdhry and Sherman (1996) and Su and Fleisher (1999). The time-lag represents a return for the marketability risk of equity. Here, Chen *et al.* (2004) indicate that a long time-lag increases the risk to IPO subscribers because investors are not informed about the share value. Similarly, Yu and Tse (2006) and Uddin (2008) also demonstrate that an extended time-lag results in IPO underpricing and high *ex-ante* uncertainty. Based on the above discussion, **H3.3** is stated as follows:

H3.3 *The information disclosure on time-lag between the IPO date and the first trading date is positively related to IPO underpricing, ceteris paribus.*

3.2.4 Earnings Management and Government Ownership

Teoh et al. (1998) and Pastor-Llorca and Poveda-Fuentes (2006) demonstrated that several firms are more aggressive in pushing earnings upwards around their IPO phase than in any other period due to large information asymmetries between investors and issuers. Thus, companies have incentives to manipulate earnings upwards to support high stock prices after going public. The IPO process is susceptible to earnings management because of information asymmetry, when investors have little knowledge of the company and security analysts are only initiating their coverage of the company. In this context, firms have incentives to engage in opportunistic behaviour reporting high earnings to maximize the offering pricing. As a consequence, the return on assets (ROA) and return on equity (ROE) present their maximum value in the year of the IPOs, and it then reverts in subsequent years (Pastor-Llorca and Poveda-Fuentes, 2006). In addition, Chen *et al*. (2004) suggested that firms with high profitability and growth rate are of interest to investors. Consequently, the IPO underpricing should therefore be greater when there is higher investor demand. Similarly, Cheung *et al*. (2009) and Su and Bangassa (2011) find a positive relationship between a firm's performance and IPO underpricing. In addition, in the Chinese IPO market, Chen *et al.* (2004) also indicated that high government ownership is perceived as an increasing agency cost for private stockholders. There are marketability and liquidity problems when IPOs start trading if many shares are held by the state. However, the same researchers also found that government ownership is positively related to the initial return. Thus, the author favours the arguments for a positive relationship between the shares owned by the Thai government and the earning performance, and IPO performance:

> ***H4*** *The percentage of shares owned by the government is positively related to IPO underpricing and to the long-run performance, ceteris paribus.*

> ***H5*** *Firm performance (ROA, ROE and delta EPS) has a positive (negative) impact on underpricing (aftermarket return), ceteris paribus.*

Moreover, Ritter (1998) found that only 26% of individual investors analyzed fundamental discrepancies between the intrinsic value and the offer price of IPOs. In a key study Eng and Aw (2000) reported that retail investors do not pay attention to the

fundamental aspects of IPOs. The researcher can therefore presume that individual and foreign investors are uninformed investors. In contrast, Lonkani and Firth (2005) and Marisetty and Subrahmanyam (2010) suggested that institutional investors are better informed about IPO quality. Furthermore, they presumed that a higher level of institutional investor participation is signalled with a higher quality of company making an IPO. Similarly, Rock (1986) and Beatty and Ritter (1986) demonstrated that informed investors always subscribe to the issues that are underpriced, whereas uninformed investors tend to receive a larger proportion of the overpriced issues. In addition to this, institutional investors reveal their information during book building. Underwriters use the information from informed investors to determine the offering price and its allocation. In return, the underwriter would distribute larger portions of IPOs to institutional investors. The more private information received, the greater is the underpricing the informed investors should earn (Aggarwal et al., 2002; Boonchuaymetta and Chuanrommanee, 2013). Hence, hypothesis (H6) can be stated as follows:

> ***H6*** *The proportion of issues subscribed by foreigners (institutions) is negatively (positively) related to the initial return.*

3.2.5 Impresario Hypothesis

For a different hypothesis, Ritter (1991 and 1998) proposed an impresario hypothesis to explain the phenomenon of IPO underperformance in the long-run. Investment bankers (the impresarios) underprice IPOs to stimulate an excess of IPO demand. Broadly speaking, the impresario, so-called 'fad' hypothesis demonstrates that the market for IPOs is subject to fads and that IPO are underpriced by investment bankers to create the appearance of excess demand, just as the promoter of a rock concert attempts to make it an event. This hypothesis suggests that the lowest subsequent returns should follow the highest initial returns. There is in fact some evidence to support this hypothesis (see Bradley *et al*., 2009 for a comprehensive review). Thus, hypothesis (H7) can be identified as follows:

> ***H7*** *The IPO underpricing is negatively related to the long-run performance of IPOs, ceteris paribus.*

Table 3.1 Testable Hypotheses to Explain Underpricing and Long-Run Performance

Hypothesis	Explanatory Variable	Variable name	IPO underpricing	Long-run Performance
			Expected Sign	Expected Sign
1. Use of IPO Proceeds	Use-of-proceed disclosure index	*UDI*	(-)	(+)
	Intended use of IPO proceeds for repaying debt	*DEBT*	(+)	(-)
	Intended use of IPO proceeds for working capital and investment	*INV*	(-)	(+)
2. *Ex-ante* uncertainty	The offer size of IPO firm	*SIZE*	(-)	
	The age of IPO firm	*AGE*	(-)	
	The time-lag between the firm establish date and the first trading date	*LAG*	(+)	
3. Earnings management and government ownership	The proportion of IPO shares owned by government	*GOV*	(+)	(+)
	Change in the earnings per share from the IPO issue date to the date just prior to the listing date	*EPS*	(+)	(-)
	Return on asset	*ROA*	(+)	(-)
	Return on equity	*ROE*	(+)	(-)
	The proportion of issues subscribed by foreigner	*PFS*	(-)	
	The proportion of issues subscribed by institution	*INS*	(+)	
4. Impresario	Market-Adjusted Initial Return or IPO underpricing	*MAIR*		(-)

Note:
The variables below are employed in the literature and in this study as explanations for the IPO underpricing in Thailand. Sections 3 and 4 of this chapter provide further detailed definitions of the explanatory variables.

3.3 Data and Methodology

The purpose of this section is threefold. First, the author provides a brief description and analysis of the data over the past decade and analyzes some of the key factors that seem to contribute to shaping its behaviour. Second, this study formulates a use-of-proceeds disclosure index for unique Thai data derived from the information in the prospectus files. The author also introduces the classification of the intended uses of the IPO proceeds as a discriminating variable to measure both the IPO underpricing and the performance of IPOs in the long-run. Third, the author presents the models that will be used in this study to measure the impact of the use-of-proceeds on IPO pricing.

3.3.1. Data

The database consists of all IPOs listed on the Stock Exchange of Thailand (SET) and Market for Alternative Investments (MAI) during the period from January 2001 to April 2012. Note that the listing criteria and regulations (e.g., capital requirement, and the number of consecutive years prior to the qualifying period required for listing minority shareholders) are more flexible in the MAI market compared to the SET market. Notice also this study starts its sample from 2001 because the annual volume of the IPO issues in

the earlier years was very low, in particular, in the years from 1997 to 1999 when there were no IPOs issued at all in Thailand.

The sources of information about the issued IPOs are the official prospectus filing forms (Form 69-1) available from the IPO filing database provided by the Securities and Exchange Commission (SEC) in Thailand.[33] The information concerning IPO companies listed on the SET and MAI during the period 2001 to 2012 was obtained from several other sources (SEC, Thailand database, SET database and SETSMART). The author collected stock prices and stock market indices from DataStream.

3.3.2 Use-of-Proceeds Disclosure Index

In this study, the author focuses on the effect of all types of information contained in the narrative use-of-proceeds section of the IPO prospectus. However, in regard to the SEC, Thailand Database, the IPO prospectus is provided in the Thai language version only. Therefore, the researcher constructs a disclosure index for measuring the levels of use-of-proceeds information reported in the unique Thai prospectuses. Firstly, this study extends disclosure of non-accounting information by classifying the intended use-of-proceeds into six major different issues, namely, working capital, general operation issues, research and development, service improvement, expanding businesses and paying down loans. Furthermore, the researcher places importance on the magnitude of use-of-proceeds disclosure. The author also subdivides the information level related to working capital and loan repayment into 2 levels (high and low) and investment into 3 levels (high, moderate and low) of disclosures (See more details and examples of the use-of-proceed disclosure index calculation in Appendix 3A, Pages 119-121).

The contents of each use-of-proceeds were compared to the items on the disclosure scoreboard and coded as 1 or 0, depending upon whether the IPO prospectus contained or did not contain the voluntary disclosure. For example, if a company revealed the use-of-proceeds to be for a specific investment project and an amount of money to be for

[33] The listed companies are obliged to publish a prospectus detailing to all investors their company profiles, including the history of the firm, the organizational structure, the offer size, the proportion of shareholders, the financial statements covering 5-year periods and the risks involved in their operations etc. This study obtained the prospectuses for all the IPOs in the sample from the SEC (http://sec.or.th). Additional information about the IPOs in database was obtained from the SET website (http://set.or.th). Further data was obtained from the SET SMART website (http://www.setsmart.com).

expanding their business as well, the author would give a score of 3 for the level of disclosure. The intended use-of-proceeds index was quantified as the percentage of recorded information items reported in the prospectus. The following formula is used to calculate the index score of each IPO company.

$$UDI_i = \left(\frac{1}{n}\sum_{i=1}^{n} D_i\right) \times 100 \qquad (3.1)$$

Where D_i expresses item i with the value found in the IPO prospectus in use-of-proceeds section, otherwise 0. n expresses the maximum of a uses-of-proceed total score in the IPO, which could be 10 scores.

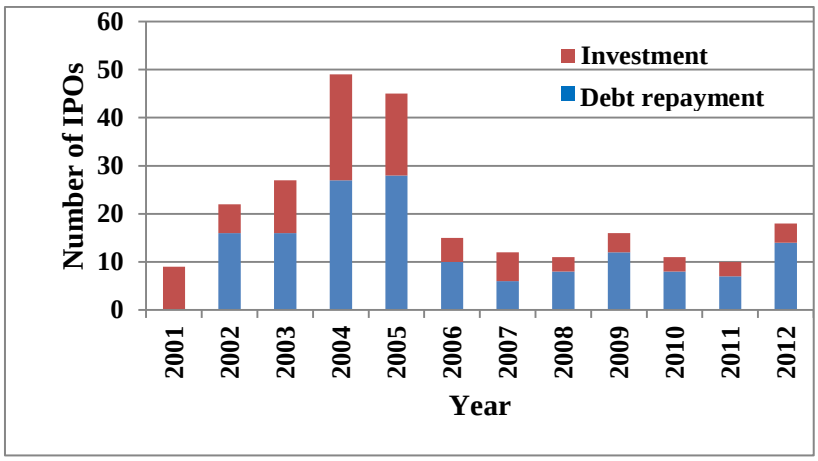


Figure 3.1 Initial Public Offerings (IPOs) with intended use of the proceeds in Thailand between 2001 and 2012 The total sample includes 245 IPOs – 152 'Investment' issues and 93 'Debt repayment' issues. The use of the proceeds is taken from the IPO prospectuses.

Table 3.2, Panel *A* summarises the sample by exchange and by year of listing. The author finds about 65% (159 out of 245 total IPOs) of IPO listings are on the SET market, whereas only 35% are listed on the MAI market. Next, this study reports the number of IPOs by industry category in Panel B, and most of the IPOs in this sample pertained to the *property & construction* sector (47 firms). For the SET market, the researcher finds that about 19% is dominated by firms from the *service* sector, 14% by *financial* sector, and 11.95% and 11.32% by *industrial* and *technological* sectors respectively. For the MAI, the majority of IPOs are dominated by *service* and *industrial* sectors.

Table 3.2 Sample Size

Panel A: sample size disaggregated by exchange and by IPO offering year						
Year	**Stock Exchange of Thailand (SET)**		**Market for Alternative Investment (MAI)**		**Total**	
	Number	**%**	**Number**	**%**	**Number**	**%**
2001	6	3.77	3	3.49	9	3.67
2002	19	11.95	3	3.49	22	8.98
2003	21	13.21	6	6.98	27	11.02
2004	37	23.27	12	13.95	49	20.00
2005	31	19.50	14	6.28	45	18.37
2006	10	6.29	5	5.81	15	6.12
2007	6	3.77	6	6.98	12	4.90
2008	8	5.03	3	3.49	11	4.49
2009	5	3.14	11	12.79	16	6.53
2010	4	2.52	7	8.14	11	4.49
2011	3	1.89	7	8.14	10	4.08
2012	9	5.66	9	10.46	18	7.35
Total	159	100.00	86	100.00	245	100.00
Panel B: sample size disaggregated by exchange and by industry group						
Industry	**Stock Exchange of Thailand (SET)**		**Market for Alternative Investment (MAI)**		**Total**	
	Number	**%**	**Number**	**%**	**Number**	**%**
Agro & Food Industry	7	4.40	3	3.49	10	4.08
Consumer Products	3	1.89	11	12.79	14	5.71
Financial	22	13.84	1	1.16	23	9.39
Industrial	19	11.95	25	29.07	44	17.96
Property & Construction	46	28.93	10	11.63	56	22.86
Resources	14	8.81	2	2.33	16	6.53
Services	30	18.87	25	29.07	55	22.45
Technology	18	11.32	9	10.46	27	11.02
Total	159	100.00	86	100.00	245	100.00

In addition, following Jeanneret (2005), this study divides the full sample into two categories according to the purposes of the use-of-proceeds; namely, investment (153 IPOs) and debt repayment (92 IPOs). While the firms in the 'Investment' sample explicitly state that their main motives for issuing equity are expanding their factories or subsidiaries including working capital and general operation issues, the main motives for 'Debt repayment' use-of-proceed are stated to be paying off their loans. However, the Thai IPOs prefer to state use-of-proceeds for investment rather than for paying off loans. Figure 3.1 plots the composition of the use of IPO proceeds each year.

3.3.3 Research Methodology

In what follows, the author first presents the model where the author considers a set of potential determinants of IPO underpricing. Next, this study examines to what extent a firm's characteristics and intended use-of-proceeds could influence the stock market performance of Thai IPOs in the long-run.

A. Measuring the Intended Use-of-Proceeds on the Underpricing

In order to measure the intended use-of-proceeds and factors affecting IPOs issue discount, a panel linear regression model was used to test the *ex-ante* uncertainty, signalling and impresario hypotheses as well as the factors known to affect underpricing. The model takes the following form:

$$\begin{aligned} MAIR_i = {} & \beta_0 + \beta_1 DEBT_i + \beta_2 INV_i + \beta_3 UDI_i + \beta_4 \ln SIZE_i + \beta_5 \ln AGE_i + \beta_6 LAG_i + \beta_7 EPS_i \\ & + \beta_8 ROA_i + \beta_9 ROE_i + \beta_{10} DE_i + \beta_{11} PFS_i + \beta_{12} INS_i + \beta_{13} GOV_i + \beta_{14} BULL_i \\ & + \sum_{j=15}^{21} \beta_j Industry_j + \sum_{j=22}^{32} \beta_j Year_j + \varepsilon_i \end{aligned} \tag{3.2}$$

where $MAIR_i$ is the market-adjusted initial return $MAIR_i$ or the IPO underpricing calculated by $[(P_{i,1} - P_{i,0})/P_{i,0}] - R_{i,m}$ or percentage change between offer price and IPO closing price on the first trading day; $P_{i,1}$ is the closing price on the first day of trading, $P_{i,0}$ is the IPO offering price, and $R_{i,m}$ is the stock market index return from the IPO date to the first trading date[34]. $DEBT_i$ (INV_i) is a dummy variable equal to 1 if the IPO reported use-of-proceeds for repaying debt (investment) and 0 otherwise. UDI_i is the use-of-proceeds disclosure index.

The proxies for *ex-ante* uncertainty are $SIZE_i$ and AGE_i, where $SIZE_i$ is the number of shares offered at the IPO multiplied by the IPO offer price, and AGE_i is the age of a firm in years from the establishment date to the date of the IPO. LAG_i is the time-lag between the IPO date and the first trading date or; GOV_i is the government ownership; EPS_i, ROA_i, ROE_i and DE_i are firm performance measures[35,36]; PFS_i and INS_i are percentages of foreign and institution investors subscribing for the IPOs respectively. $DEBT_i$ and INV_i are the types of intended use-of-proceeds. Other variables include $BULL_i$, $Industry_j$ and

[34] $R_{i,m}$ is calculated by $(SET_1\text{-}SET_0)/SET_0$ or $(MAI_1\text{-}MAI_0)/MAI_0$. SET_1 (MAI_1) is the closing price of the Stock Exchange of Thailand (Market for Alternative Investment) index on the first trading date and SET_0 (MAI_0) is the closing price of the Stock Exchange of Thailand (Market for Alternative Investment) index on the IPO date.

[35] As mentioned in Section 3.2.4, in order to control for the accounting earnings for the normal amount of mean reversion, this study employed the ROA and ROE to the models as control variables. Accounting ratios, rather than net income, are used to control for variations in size across firms (Kao et al., 2009). Also, ROA which measures the marginal benefit of an investment (Sulva and Bilinski, 2015); intuitively, given a firm's discount rate and, high profitability indicating a high net present value of projects which itself stimulates new investment,

[36] In cases of the Thai IPO prospectuses, the ROA is calculated by net income/total assets; ROE is calculated by net income/total equity and EPS is calculated by net income (- dividends on preferred stocks)/the number of outstanding shares.

$Year_j$ are control variables for bull market conditions, industry and year effects; and ε_i is the regression error term.

B. Measuring the Intended Use of Proceeds on the long-run performance of IPOs

Next, this study further examines the impact of the intended use-of-proceeds disclosure on the stock market performance of Thai IPOs in the long-run. Note that the literature provides mixed suggestions on whether to use cumulative abnormal returns $(CAR_{i,t})$ or buy-and-hold abnormal return $(BHAR_{i,t})$ to measure the IPO performance in the long-run. For example, Barber and Lyon (1997), Lyon *et al*. (1999) indicated that to compare the $CARs$ against market performance may result in misspecification. However, by contrast, Fama (1998) in particular argues in favour of the use of $CARs$ rather than $BHARs$. Hence, this study considers both and the model is identified as follows:

$$BHAR_i(CAR_i) = \delta_0 + \delta_1 DEBT_i + \delta_2 INV_i + \delta_3 UDI_i + \sum_{j=4}^{k} \delta_j X_{ij} + \xi_i \qquad (3.3)$$

where $BHAR_i$ and CAR_i are measures of 3-year post abnormal IPOs returns, respectively; UDI_i is the use-of-proceeds disclosure index; $DEBT_i$ (INV_i) is a dummy variable equal to 1 if the IPO stated use of proceed for repaying debt (investment) and 0 otherwise. $X_{i,j}$ is a vector of factors including IPO underpricing known to define the long-run performance of IPOs; the researcher also uses a range of dummy variables to control the market movement and industry effects as seen in equation (3.2).

The dependent variable in (3.3) has been calculated as follows:

$$BHAR_{i,t} = \prod_{t=1}^{T}(1 + R_{i,t}) - \prod_{t=1}^{T}(1 + R_{m,t}) \qquad (3.4)$$

where $R_{i,t}$ and $R_{m,t}$ are the monthly returns on stock i and the market index in the event month t respectively.

The market-adjusted abnormal returns of company *i* in event month *t* ($AR_{i,t}$) are calculated for each event month *t* as follows: $AR_{i,t} = R_{i,t} - R_{m,t}$. Thus, $R_{i,t} = (P_{i,t} - P_{i,t-1})/P_{i,t-1}$, where $P_{i,t}$ is the last traded price of the company in event month *t* and $P_{i,t-1}$is the last traded price of the company in event month *t*-1. $R_{m,t}$is the return on the market index (SET or MAI indices) in month *t* and is calculated as$R_{m,t} = (P_{m,t} - P_{i,m-1})/P_{m,t-1}$ where $P_{m,t}$ is the last closed stock market index in month *t* and $P_{m,t-1}$ is the last closed market index in event month *t*-1.

The average market-adjusted return for a sample of *n* firms in month *t* is defined as follows:

$$\overline{AR}_{i,t} = \frac{1}{n}\sum_{i=1}^{n} AR_{i,t} \tag{3.5}$$

The cumulative average abnormal return of company *i* from event month 1 to event month *T* is defined as follows:

$$\overline{CAR}_{i,t} = \sum_{i=1}^{T} \overline{AR}_{i,t} \tag{3.6}$$

This study uses the 'Robust Standard Errors' in finite samples to overcome the heteroscedasticity problem referred to as Huber/White estimators. For the robust standard errors[37], an apparent improvement is possible. For example, Davidson and MacKinnon (1993) report two variance-covariance estimation methods that seem, at least in their Monte Carlo simulations, to converge more quickly, as sample size *n* increases, to the correct variance/covariance estimates. Thus their methods seem valid, although they require more computational time problems. Overall, the use of robust S.E. does not change the coefficient estimates, but it makes changes in the standard errors and provides reasonably accurate *p*-values[38].

[38] For more details on Huber/White estimators see White, H. (1980).

3.4 Empirical Results and Discussion

In this section, the author first reports the descriptive statistics of the data. Next, the author presents the findings on the determinants of IPO underpricing and long-term stock performance, respectively. All models allow for industry-specific and year fixed effects and all tables report robust standard errors.

3.4.1 Descriptive Statistics

This study starts the analysis by reporting the descriptive statistics. Table 3.3 presents the IPO transactions disaggregated by stock market and by the IPO offering year and provides a snapshot of the annual variation in issuing firm characteristics between 2001 and 2012. This study also assesses the significance of changes over time by using the non-parametric test for trend across different groupings. As can be seen from Table 3.3, the average SET issuer was approximately 11 to 28 years old versus 7 to 28 years old for the average MAI issuer. The mean offering size almost tripled over the period (328 million Baht in 2001 versus 1,110 million Baht in 2012). It can clearly be seen in the MAI IPOs that they are more likely to use the IPO proceeds for investment (about 70% of IPOs) in comparison with using them for debt repayment (30%). The use-of-proceeds disclosure indices are on average at 31.57%, 31.38% and 31.92% for the entire, SET and MAI samples respectively. Furthermore, it is noticeable that the large-sized (SET) companies are more likely to state their use-of-proceeds to be for debt repayment or re-capital structure,; this is in direct contrast with the data reported by Carpenter and Rondi (2006) on recent Italian use of proceeds where small firms utilized their IPO proceeds for re-balancing their capital structure.

Furthermore, IPO underpricing is evident across almost all the years in the sample period and across both stock markets. This study finds that the means of IPOs underpricing are 25.36%, 20.61% and 34.16% for the entire, the SET and the MAI samples respectively, suggesting that our data share a common feature with other markets around the world, i.e., noticeable underpricing (see Ritter, 1998; Ljungqvist, 2007). These findings indicate that the underpricing is more intense in the MAI compared to the other market. The average levels of Thai IPO underpricing are slightly larger than those reported in earlier research (Chorruk and Worthington, 2010; Boonchuaymetta and Chuanrommanee, 2013).

However, the underpricing of IPOs in Thailand is still lower than that in developing markets (Jelic et al., 2001; Yu and Tse, 2006; Ahmad-Zaluki et al., 2007; Gao, 2010). The lower proportion of institutional and foreign investors subscribing for IPOs suggeststhat there are many uninformed investors, both retail and individual, in the sub-market. It indeed requires a higher degree of underpricing in order to attract uninformed investors to subscribe for MAI IPOs. The author believes that the lower underpricing in SET is justified as the size of the firms in the SET is larger than those in the MAI. In line with the previous literature, a higher offer size was related to lower IPO underpricing as a result of asymmetric information (Carter *et al.*, 1998; Chen *et al*., 2004; Chi and Padgett, 2005; Yu and Tse, 2006; Cheung *et al*., 2009; Sullivan and Unite, 2009; Su and Bangassa, 2011). For the Thai IPO market trend across different time periods, this study finds that the initial return was, on average, negative or as low as -1.01% only in 2006, whereas it was positive for the other year-periods, in particular the average IPO underpricing turning out to be significantly higher in 2011 and 2012 (73.82%), which is clearly an indication of the impact of information disclosure (amount and type) on underpricing. Overall, this implies that the Thai disclosure was mainly used to provide information on investments.

From the sample, the author also formed two-groups according to the use of the proceeds following that by Jeanneret (2005)[39]. Table 3.4 reports the estimates associated with the type of disclosure (investment and loan as the intended use-of-proceeds. It is worth noting that 152 of Thai IPOs (62.04%) have discloses information in the intended use-of-proceeds section for investment including working capital and general corporate purposes and 38% for the use of debt repayment. Based on the disclosure index (*UDI*), the IPOs stated use-of-proceeds for investment disclose more information (38.71%) than debt repayment IPOs (20.35%). For the average issue size, the author finds that the size of IPO firms that use disclosure for repaying debt as their use-of-proceeds is smaller than those associated with investment use-of-proceeds. The subscription details for IPOs for foreign and institutional investors are also reported in Tables 3.3 and 3.4 for each individual market and for the full sample respectively. However, the average foreign and institutional participation percentage, clearly indicates that such investors prefer to preempt the IPOs in the SET rather than in the MAI. The average foreign and institutional investors' subscriptions for SET are 9.82% and 20.52%, but are only 4.83% and 7.99% in

[39] Jeanneret (2005) studied the use-of-proceeds of 232 French SEOs. He formed two-subsamples: 'Capital Structure' and 'Financing New Investment'. To be ranked in the 'Finance new investment', the issuer must specify that the proceeds will be spent on internal growth projects (a new plant, a new product or a new market segment) or on external growth opportunities (acquisitions). Companies in the 'Capital Structure' sample explicitly stating that their main motives for issuing equity are to improve their capital structure or debt repayment.

the MAI respectively. Notably, there was a significant increase in the number of investors that subscribed for new issues between 2005 and 2006. In contrast, the proportion of foreign (institution) investors subscribing for IPOs immediately decreased over time, from 9.42% (16.16%) in 2007 to 2.63% (4.15%) in 2012.

Moving on to the underpricing and long-run IPOs returns, the first two columns of Table 3.4 show the means and medians of both sub-samples. The findings show that the average market-adjusted initial return of IPOs stated use of proceeds for investment (25.79%) is slightly higher than those for debt repayment (24.67%). Furthermore, this study finds that the 6-month, 1-, 2- and 3-year *BHARs* of IPOs stating their IPO proceeds to be used for investment are 5.41%, 16.51%, 14.58% and 13.70% respectively and all are statistically significant at 1% higher than the *BHARs* of IPOs stating their IPO proceeds to be for repaying debt (-10.55%, -11.64%, -36.15% and -45.04% respectively). For CARs the same pattern of results holds. It can be clearly seen that the initial return and the long-run returns of the 'Investment' IPOs are higher than those of the 'Debt Repayment' IPOs. These findings are in line with Autore *et al*. (2009) and Sulva and Bilinski (2015) who reported that issuers stated their use-of-proceeds to be for investments perform better than those who aim for recapitalization in the long-run. As for firms' characteristic, the researcher finds insignificant differences between the two types of intended use-of-proceeds.

Overall, this study finds no convincing evidence or statistical difference between intended use-of-proceeds for 'Investment' and 'Debt repayment' IPOs based on the magnitudes of IPO underpricing. The researcher nevertheless, finds evidence supporting the claim that 'Investment' IPO firms perform better than 'Debt repayment' IPO firms in the long-run.

Table 3.3 Summary statistics for Thai IPOs

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2001-2012	Trend Sig.
Stock Exchange of Thailand														
Use-of-proceeds disclosure index (%)	15.15	29.18	30.30	29.23	36.36	30.90	21.21	35.22	27.27	34.09	54.54	38.38	31.38	***
Intended use-of-proceeds for investment	0	13	12	19	20	5	2	6	3	3	2	7	92	*
Intended use-of-proceeds for debt repayment	6	6	9	18	11	5	4	2	2	1	1	2	67	-
Average offering size (million Baht)	489	506	821	2050	854	3,520	1,800	2,910	879	1,510	1,260	1,940	1,630	***
Average firm age (year)	13.40	10.60	14.33	12.49	17.55	12.70	14.17	25.62	27	14.75	21.67	12.88	14.97	**
Average foreigner investor subscription (%)	3.50	7.94	7.45	12.52	12.68	16.73	11.55	9.36	3.26	1.06	2.66	4.00	9.82	***
Average institution investor subscription (%)	10.80	18.17	21.75	24.53	25.81	27.78	20.98	17.00	8.52	8.16	3.33	7.11	20.52	***
IPO underpricing (%)	43.47	14.34	50.21	12.46	8.24	4.28	27.41	3.88	1.90	27.75	12.94	63.99	20.61	**
Market for Alternative Investment														
Use-of-proceeds disclosure index (%)	21.21	42.42	25.75	34.09	24.02	32.72	28.78	33.33	32.23	41.55	28.57	41.41	31.92	*
Intended use-of-proceeds for investment	0	3	4	8	8	5	4	2	9	5	5	7	60	-
Intended use-of-proceeds for debt repayment	3	0	2	4	6	0	2	1	2	2	2	2	26	-
Average offering size (million Baht)	43.76	72.06	127	107	130	149	128	125	119	98.42	166	463	156	***
Average firm age (year)	7.39	28.11	12.33	11.17	13.28	19.80	13.83	17.33	13.18	20.43	13.57	24.11	15.52	**
Average foreigner investor subscription (%)	12.33	1.94	5.19	8.11	10.63	4.06	7.29	0.41	1.27	0.32	0.26	1.26	4.83	***
Average institution investor subscription (%)	1.66	0.66	5.48	13.45	19.36	12.36	11.35	15.67	1.64	0.57	0.71	1.19	7.99	***
IPO underpricing (%)	15.76	-0.04	56.66	33.44	2.73	-11.61	33.17	24.70	16.58	49.62	87.59	83.64	34.16	***
Entire sample														
Use-of-proceeds disclosure index (%)	17.17	30.99	29.29	30.42	32.52	31.51	25.00	34.71	30.68	38.84	36.36	39.89	31.57	***
Intended use-of-proceeds for investment	0	16	16	27	28	10	6	8	12	8	7	14	152	***
Intended use-of-proceeds for debt repayment	9	6	11	22	17	5	6	3	4	3	3	4	93	*
Average offering size (million Baht)	328	447	667	1,570	629	2,390	963	2,150	357	613	495	1200	1,110	***
Average firm age (year)	11.39	12.98	13.88	12.16	16.22	15.06	14.00	23.36	17.50	18.36	16.00	18.50	15.16	***
Average foreigner investor subscription (%)	6.47	7.12	6.94	11.44	12.04	12.51	9.42	6.91	1.89	0.5	0.98	2.63	8.06	***
Average institution investor subscription (%)	7.74	15.78	18.13	21.81	23.80	22.64	16.16	16.63	3.78	3.33	1.50	4.15	16.12	***
IPO underpricing (%)	34.23	12.37	51.64	17.59	6.52	-1.01	30.29	9.55	11.99	41.67	65.19	73.82	25.36	***

Note:

This table summarizes the data on 245 initial public offerings (IPOs) issued in Thailand between 2001 and 2012. The data are classified into 2 groups, based on the stock market listing: Stock Exchange of Thailand and Market for Alternative Investment groups. The issued size of IPOs is presented in Thai Baht. The non-parametric test for trend across ordered groups, which is an extension of the Wilcoxon rank-sum test, is employed. Lack of significance is indicated as -.

* Statistically significant at the 0.01 level.

** Statistically significant at the 0.05 level.

*** Statistically significant at the 0.10 level.

Table 3.4 Descriptive Statistics of the Main Variables

UDI: Use-of-Proceeds disclosure index (%); MAIR: the market-adjusted initial return or the IPO underpricing (%); 6-month, 1-, 2- and 3-year *BHARs* and *CARs*: six-month, one-, two-, three-year buy-and-hold abnormal returns (%) and cumulative abnormal returns (%); *SIZE*: the offer size of IPO firms (million Baht); *AGE*: the age of the firm in years from the establishment date to the year of IPO (year); *LAG*: the time-lag between IPO date and the first trading date (day); *EPS*: change in the earnings per share from the IPO issue date to the date just prior to the listing date (%); *ROA*: the return on assets for the most recent year prior to or in the year of the offering (%); *ROE*: the return on equity for the most recent year prior to or in the year of the offering (%); *DE*: debt/equity ratio for the most recent year prior to or in the year of the offering (times); *PFS*: the percentage of foreigners subscribing for the issues (%); *INS*: the percentage of institutions subscribing for the issues (%); *GOV*: the proportion of shares owned by the government (%). The significance of the difference in the mean (median) of variables between 'Investment' and 'Debt repayment' IPO sample measures is computed using the independent-sample *t*-test (the non-parametric test namely two-sample Wilcoxon rank-sum (Mann-Whitney) test).

Variable	**Intended uses of IPO proceeds for 'Investment'**				**Intended uses of IPO proceeds for 'Debt repayment'**				**Different**	
	Mean	**Median**	**Std.**	***N***	**Mean**	**Median**	**Std.**	***N***	***t*-stats**	***z*-stats**
UDI	38.71	36.36	0.94	152	20.35	18.18	1.22	93	-11.87***	-9.88***
MAIR	25.79	8.88	47.28	152	24.67	9.94	40.42	93	-0.20	-0.14
6-month *BHAR*	5.41	-3.26	3.48	140	-10.55	-15.44	38.11	88	-2.98***	-3.23***
1-year *BHAR*	16.51	-4.70	77.06	132	-11.64	-22.34	72.07	86	-2.91***	-3.60***
2-year *BHAR*	14.58	-2.47	100.15	125	-36.15	-41.30	61.48	84	-4.53***	-4.03***
3-year *BHAR*	13.7	-3.60	108.86	117	-45.04	-48.61	73.22	80	-4.52***	-4.06***
6-month *CAR*	5.50	-0.30	38.34	140	-1.46	-14.76	42.00	88	-2.90***	-3.06***
1-year *CAR*	10.64	3.91	57.80	132	-2.66	-18.71	55.29	86	-3.65***	-3.86***
2-year *CAR*	3.18	4.02	74.15	125	-19.18	-38.12	69.88	84	-4.82***	-4.54***
3-year *CAR*	8.97	9.66	89.79	117	-14.48	-38.95	73.31	80	-4.55***	-4.13***
AGE	15.13	13.00	11.07	152	15.2	12.00	12.98	93	0.04	-0.01
SIZE	1,137.85	235.40	3,885.2	152	1,073.9	300.00	3,215.86	93	0.13	1.50
LAG	12.34	11.00	5.57	152	12.62	11.00	8.29	93	0.28	-0.76
EPS	55.32	0.03	616.45	152	127.59	0.13	381.11	93	1.02	1.01
ROA	14.84	0.10	20.01	152	13.65	0.09	26.11	93	-0.37	-0.83
ROE	27.41	0.25	37.59	152	27.96	0.25	25.99	93	0.13	-0.24
DE	1.71	1.50	1.36	146	3.49	2.07	5.45	91	3.06***	3.82***
GOV	2.06	0.03	12.18	152	2.03	0.03	11.6	93	-0.02	0.25
PFS	7.5	0.06	11.46	152	8.99	0.12	14.43	93	0.85	0.44
INS	15.36	0.00	19.01	152	17.37	0.00	18.14	93	0.82	1.16

Note:

The sample consists of 245 IPOs made during the entire sample period (2001-2012). The significance of the difference in mean and median between 'Investment' IPOs and 'Debt repayment' IPOs

* Statistically significant at the 0.01 level.

** Statistically significant at the 0.05 level.

*** Statistically significant at the 0.10 level.

3.4.2 Determinants of IPO Underpricing

The results from Equation (3.2) for the full sample are presented in Table3.5. Overall, this study shows that the models (1) to (9) with a representative profile of IPO underpricing in the stock market of Thailand explain about 38.5% to 50.99% of variations in IPO underpricing[40]. The robust standard error is further employed to ensure that all regression models do not suffer from the heteroscedasticity problem and to improve the small-sample robust estimators for OLS. In order to detect the potential influence of multicollinearity in the regression, the author used the Variance Inflation Factors (VIFs)[41] and found that none of the estimates exceed the accepted threshold of 10 (Neter *et al*., 1985). Thus, there is no clear evidence of multicollinearity in the data.

The author first examines the relationship between the levels of intended use-of-proceeds disclosures and IPO pricing. The findings support ***H1.1*** and imply that firm managers can indeed reduce underpricing (cost of equity capital) by disclosing more information. To confirm this finding, the author constructs a use-of-proceeds disclosure index (UDI) for Thai data and inserts it into the model. The result shows that the UDI has a statistical negative impact on IPO underpricing. This is consistent with the results from prior empirical studies (e.g., Schrand and Verrecchia, 2002; Healey and Palepu, 2001; Leone *et al*., 2007; Chahine and Filatochev, 2008). This chapter also considers the types of use-of-proceeds affecting the cost of equity. The author therefore examines the relationship between 'Investment' use-of-proceeds and IPO underpricing. The findings show that INV has a negative effect on IPO underpricing. Furthermore, in line with Leone *et al*. (2007) this study finds that the use-of-proceeds disclosure assists investors in evaluating IPOs by narrowing their estimate of the dispersion of the stock's secondary value. This implies a reduction in *ex-ante* uncertainty, and IPOs with such disclosures go public at offering prices closer to 'intrinsic' values and, as a result, are subject to less IPO underpricing on the first trading day (Beatty and Ritter, 1986; Leone *et al*., 2007). These findings also support ***H2.1*** that when issuers disclose that they are to use the IPO proceeds for investment, operating expenses, expanding factories and subsidiaries or working capital, there is lower *ex-ante* uncertainty. In contrast, for the use-of-proceeds for debt

[40] The author further uses a simple regression of initial returns on intended use-of-proceed dummy variables for 'Investment' and 'Debt repayment' IPOs. The univariate results are not reported on this study. However, this study finds that there is no statistically significant between use of proceeds disclosure and the IPO underpricing.

[41] VIF is calculated as $1/(1 - R^2)$ where R^2 is obtained from the regression of the variable on all other regressors specified in the model.

repayment,$DEBT$, the author finds that $DEBT$ is positively related to the underpricing and is significant. Once issuers intend to use the IPO proceeds for recapitalization (repaying their debts), there is greater uncertainty about the financial sustainability of their business model. A possible justification for the difference between 'Investment' and 'Debt Repayment' IPOs in terms of underpricing is that the Thai IPO companies that intend to use the proceeds for investment disclose more information on their future operation proposals than the 'Debt Repayment' IPO companies that merely provide information on their use of proceeds for repaying short-term or long-term debts. Consequently, the cost of equity capital is high (leaving more money on the table with discount IPO issues at the higher rate) for the latter.

As firm characteristics, the author finds that the offer size ($lnSIZE$) of an IPO firm is negatively related to the IPO underpricing and is significant at the 1% and 5% levels of significance for the entire SET and MAI IPOs markets, which support ***H2.1*** that the coefficient on $lnSIZE$ is negative and significant. These findings are in line with Rock (1986), Beatty and Ritter (1986), Vichakorn and Kennedy (2005), Yu and Tse (2006), Chin and Padgett (2005), Guo and Brooks (2008), Authurs *et al.* (2009), Su and Bangassa (2011) and Lin and Tian (2012). Other variables (lnAGE and lag LAG) failed to yield reasonable significant parameters, which does not support ***H3.2-H3.3***. These results are in contrast to the findings of Sullivan and Unite (1999), Chen *et al*. (2004), Kirkulak and Davis (2005), Yu and Tse (2006), Uddin (2008) and Ekkayokkaya and Pengniti (2012) amongst others. For the signalling hypothesis measured by GOV, EPS, ROE, PFS and INS and the degree of underpricing, the author finds an insignificant relationship in the Thai market leading us to reject ***H4-H5***. Nevertheless, the ROA variable has a significantly positive coefficient in models (5) and (6), confirming that the return on asset has a significant influence on underpricing in the SET.

For market sentiments (bull-market dummy variable BULL), as seen in Table 3.5 (across models (1) through (3)), the author finds a positive relationship with IPO underpricing for the entire and MAI IPOs. This is in line with the previous literature that found a correlation between IPO underpricing and market sentiment and movement (Loughran and Ritter, 2002; Su, 2004; Yu and Tse, 2006; Kirkulak and Davis, 2005; Ekkayokkaya

and Pengniti, 2012)[42]. Furthermore, this study finds that *DE* has a negative impact on the magnitude of IPO underpricing for the entire and the SET IPOs.

Using bootstrap standard error, the findings in Table 3.5 indicate that the bootstrap simulation produces a similar pattern of results, where the intended use-of-proceeds for investment (debt repayment) has a negative (positive) impact on IPO underpricing as well as insignificant results for the majority of other controlling variables.

3.4.3 Use-of-proceeds and factors impacting on the long-term performance of IPOs

This section examines the long-run return performance of Thai IPOs using Equation (3.2). As a starting point for this long-term performance analysis, we estimate a simple regression of the aftermarket abnormal returns on dummy variables for 'Investment' and 'Debt Repayment'. For the univariate results, the researcher finds that the intended use-of-proceeds for investment (debt repayment) has a positive (negative) effect on three-year buy-and-hold abnormal return.

Controlling for a fixed set of firm and offer characteristics, Table 3.6 presents OLS estimates using the three-year buy-and-hold abnormal return (*BHAR*) as the dependent variable. The author finds that the disclosure index (UDI) is positively related to the three-year aftermarket return and is statistically significant apart from the MAI IPOs. The finding is in line with ***H1.2*** and supports the previous accounting studies that intellectual capital disclosure in IPO prospectuses is a significant factor and has a positive effect on the long-run financial performance of firms (e.g. Guo *et al*., 2004; Bessler and Bittelmeyer, 2008; Neilson *et al*., 2015). This finding implies that a Thai company that discloses substantial amounts of information on the intended use-of-proceeds will be associated with better transparency and thus perform better in the long-run.

[42] Furthermore, Lowry and Schwert (2000) suggested that public information about market conditions during the register period should be predictably related to initial returns.

Table 3.5 OLS Estimates-Robust and Bootstrap Standard Errors (MAIR)

Variables	Entire IPOs						SET IPOs						MAI IPOs					
	(1) OLS		(2) OLS		(3) OLS		(4) OLS		(5) OLS		(6) OLS		(7) OLS		(8) OLS		(9) OLS	
	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]
Constant	2.290	(0.580)*** [0.592]***	2.358	(0.539)*** [0.573]***	2.309	(0.531)*** [0.546]***	1.771	(0.867)** [0.843]**	1.917	(0.752)** [0.818]**	1.787	(0.730)** [0.788]**	3.518	(2.150)* [2.083]*	3.770	(1.651)** [2.247]*	3.759	(1.670)** [2.413]*
UDI	-0.003	(0.002)* [0.002]*					-0.003	(0.002) [0.002]					-0.004	(0.005) [0.005]				
INV			-0.094	(0.056) [0.057]					-0.166	(0.065)** [0.073]**					0.130	(0.140) [0.170]		
DEBT					0.096	(0.054)* [0.056]*					0.163	(0.062)*** [0.066]**					-0.088	(0.135) [0.185]
ln*SIZE*	-0.120	(0.029)*** [0.030]***	-0.126	(0.027)*** [0.029]***	-0.126	(0.027)*** [0.028]***	-0.087	(0.042)** [0.042]**	-0.095	(0.037)** [0.041]**	-0.093	(0.037)** [0.041]**	-0.183	(0.112)* [0.112]*	-0.198	(0.088)** [0.115]*	-0.195	(0.087)** [0.130]
ln*AGE*	0.048	(0.037) [0.038]	0.041	(0.034) [0.035]	0.041	(0.034) [0.035]	0.056	(0.046) [0.044]	0.041	(0.039) [0.045]	0.039	(0.038) [0.042]	-0.003	(0.082) [0.092]	-0.022	(0.064) [0.104]	-0.020	(0.064) [0.094]
LAG	-0.002	(0.005) [0.004]	-0.003	(0.004) [0.005]	-0.003	(0.004) [0.005]	0.001	(0.007) [0.009]	0.001	(0.006) [0.008]	0.001	(0.006) [0.008]	-0.002	(0.012) [0.013]	-0.005	(0.007) [0.015]	-0.004	(0.007) [0.015]
EPS	0.001	(0.007) [0.006]	0.001	(0.005) [0.006]	0.001	(0.005) [0.007]	0.004	(0.008) [0.007]	0.003	(0.005) [0.008]	0.003	(0.005) [0.007]	-0.024	(0.050) [0.059]	-0.017	(0.044) [0.052]	-0.021	(0.044) [0.058]
ROA	0.034	(0.186) [0.236]	0.023	(0.160) [0.190]	0.028	(0.157) [0.180]	-0.290	(0.239) [0.240]	-0.295	(0.138)** [0.214]	-0.292	(0.138)* [0.211]	0.153	(0.383) [0.486]	0.211	(0.241) [0.524]	0.190	(0.245) [0.580]
ROE	0.074	(0.123) [0.171]	0.076	(0.108) [0.121]	0.079	(0.108) [0.119]	0.046	(0.127) [0.131]	0.040	(0.076) [0.116]	0.042	(0.076) [0.119]	0.114	(0.329) [0.419]	0.034	(0.268) [0.418]	0.024	(0.272) [0.462]
DE	-0.019	(0.008)** [0.007]**	-0.018	(0.006)*** [0.009]**	-0.018	(0.006)*** [0.009]**	-0.020	(0.009)** [0.010]*	-0.022	(0.008)*** [0.010]**	-0.022	(0.008)*** [0.010]**	-0.058	(0.051) [0.055]	-0.033	(0.048) [0.061]	-0.039	(0.048) [0.066]
PFS	0.144	(0.293) [0.320]	0.180	(0.275) [0.296]	0.177	(0.275) [0.287]	-0.043	(0.405) [0.413]	0.034	(0.346) [0.389]	0.026	(0.348) [0.390]	0.212	(1.526) [1.326]	0.269	(0.559) [1.209]	0.266	(0.588) [1.379]
INS	-0.001	(0.192) [0.206]	-0.002	(0.187) [0.194]	0.004	(0.188) [0.184]	-0.011	(0.256) [0.248]	-0.026	(0.220) [0.235]	-0.016	(0.223) [0.238]	-0.272	(0.499) [0.538]	-0.138	(0.421) [0.555]	-0.139	(0.416) [0.632]
GOV	0.345	(0.262) [0.200]*	0.359	(0.182) [0.282]	0.360	(0.193) [0.279]	0.196	(0.300) [0.354]	0.223	(0.253) [0.334]	0.204	(0.268) [0.397]						
BULL	0.127	(0.059)** [0.063]**	0.138	(0.057)** [0.058]**	0.139	(0.057)* [0.059]**	0.068	(0.074) [0.074]	0.088	(0.063) [0.069]	0.094	(0.063) [0.067]	0.198	(0.128) [0.140]	0.198	(0.114)* [0.147]	0.198	(0.112)* [0.143]
Year	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
N	237		237		237		153		153		153		84		84		84	
MAX VIF.	6.79		6.56		6.55		6.79		6.56		6.55		6.41		6.56		6.55	
R^2 (%)	38.57		38.50		38.59		38.57		41.18		41.16		51.11		50.99		50.59	
F-stats	3.15***		3.28***		3.27***		1.75		1.84**		1.80**		1.66*		1.96**		1.91**	

Note:

Other estimators shown here include Davidson and MacKinnon's (1993) improved small-sample robust estimators for OLS, cluster-robust estimators useful when errors may be arbitrarily correlated within groups (one application is across time for an individual).

*, ** and *** Statistically significant at the 0.01, 0.05 and 0.01 levels respectively. Robust standard errors (RSE) are reported in parentheses, and bootstrap standard errors (BSE) are reported within brackets.

Table 3.6 OLS Estimates-Robust and Bootstrap Standard Errors (BHARS)

Variables	Entire IPOs						SET IPOs						MAI IPOs					
	(10) OLS		(11) OLS		(12) OLS		(13) OLS		(14) OLS		(15) OLS		(16) OLS		(17) OLS		(18) OLS	
	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]
Constant	2.079	(1.837) [1.726]	1.617	(1.769) [1.616]	2.100	(1.817) [1.719]	0.969	(2.558) [2.447]	0.518	(2.565) [2.217]	1.213	(2.754) [2.551]	7.456	(5.998) [6.877]	6.882	(6.401) [6.145]	7.765	(5.590) [6.791]
UDI	0.009	(0.005)* [0.005]*					0.018	(0.006)*** [0.006]***					-0.003	(0.018) [0.019]				
INV			0.470	(0.149)*** [0.142]**					0.508	(0.196)*** [0.171]***					0.595	(0.399)** [0.413]		
DEBT					-0.333	(0.156)** [0.142]**					-0.280	(0.188)* [0.167]*					-0.667	(0.374)* [0.454]
MAIR	-0.622	(0.246)** [0.224]***	-0.542	(0.250)** [0.218]**	-0.568	(0.258)** [0.221]**	-0.701	(0.282)** [0.242]***	-0.586	(0.282)** [0.247]**	-0.657	(0.302)** [0.264]**	-0.478	(0.505) [0.636]	-0.449	(0.527) [0.448]	-0.411	(0.490) [0.465]
lnSIZE	-0.114	(0.085) [0.083]	-0.086	(0.080) [0.077]	-0.101	(0.082) [0.082]	-0.047	(0.127) [0.123]	-0.017	(0.123) [0.114]	-0.042	(0.131) [0.126]	-0.391	(0.316) [0.370]	-0.367	(0.316)** [0.343]	-0.394	(0.286)* [0.381]
lnAGE	0.043	(0.102) [0.094]	0.071	(0.096) [0.095]	0.071	(0.098) [0.092]	0.052	(0.121) [0.113]	0.095	(0.122) [0.121]	0.077	(0.122) [0.122]	0.198	(0.227) [0.289]	0.135	(0.251) [0.263]	0.117	(0.226) [0.277]
EPS	0.004	(0.010) [0.014]	0.006	(0.013) [0.015]	0.005	(0.012) [0.015]	0.007	(0.017) [0.018]	0.011	(0.014) [0.015]	0.010	(0.012) [0.013]	0.080	(0.123) [0.171]	0.051	(0.217) [0.182]	0.048	(0.133) [0.198]
ROA	-0.914	(0.865) [0.719]	-0.847	(0.655)** [0.683]	-0.886	(0.717)** [0.721]	-1.048	(0.961) [0.873]	-0.930	(0.854)** [0.869]	-0.939	(0.933)** [0.901]	0.394	(2.205) [3.012]	0.455	(2.788) [2.504]	0.095	(2.243) [2.703]
ROE	0.222	(0.419) [0.371]	0.212	(0.320) [0.340]	0.195	(0.350) [0.374]	0.143	(0.536) [0.503]	0.144	(0.478) [0.520]	0.135	(0.521) [0.513]	-1.464	(0.821)* [2.203]*	-1.376	(1.041)*** [1.689]	-1.336	(0.739)* [1.974]
DE	-0.006	(0.030) [0.031]	0.001	(0.032) [0.031]	-0.005	(0.030) [0.031]	0.006	(0.029) [0.032]	0.006	(0.036) [0.037]	-0.002	(0.034) [0.035]	-0.165	(0.146) [0.190]	-0.067	(0.118) [0.139]	-0.060	(0.109) [0.159]
PFS	-0.141	(0.610) [0.608]	-0.250	(0.512) [0.556]	-0.237	(0.503) [0.536]	-0.397	(0.780) [0.774]	-0.850	(0.798) [0.826]	-0.733	(0.798) [0.763]	-0.296	(1.579) [2.767]	-0.153	(1.677) [2.042]	-0.052	(1.459) [2.113]
INS	0.454	(0.532) [0.505]	0.489	(0.510) [0.493]	0.466	(0.520) [0.492]	0.661	(0.561) [0.519]	0.744	(0.640) [0.563]	0.683	(0.641) [0.553]	0.403	(1.941) [1.937]	0.450	(1.990) [1.711]	0.475	(1.735) [1.596]
GOV	1.473	(0.923)* [0.889]*	1.349	(0.937)* [0.947]	1.444	(1.032)* [1.048]	0.937	(0.676)* [0.863]	0.942	(0.918)* [0.870]	1.077	(1.006)* [1.045]						
Year	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
N	190		190		190		133		133		133		57		57		57	
MAX VIF.	5.78		6.05		6.05		5.78		6.05		6.05		5.78		5.81		5.81	
R^2(%)	26.41		29.06		27.14		41.79		41.86		38.73		66.81		71.45		72.88	
F-stats	1.73**		2.86***		2.68***		2.97***		4.42***		6.31***		1.83*		2.86***		3.07***	

Note:

Other estimators shown here include Davidson and MacKinnon's (1993) improved small-sample robust estimators for OLS, cluster-robust estimators useful when errors may be arbitrarily correlated within groups (one application is across time for an individual). *, ** and *** Statistically significant at the 0.01, 0.05 and 0.01 levels respectively. Variance Inflation Factor (VIF) is employed to detect multicollinearity problem and is calculated as 1/(1 - R2) where R2 is obtained from the regression of the variable on all other regressors specified in the model. Robust standard errors (RSE) are reported in parentheses, and bootstrap standard errors (BSE) are reported within brackets.

In addition, the findings support ***H2.2*** that $DEBT$ is negatively related to the *BHAR* and is statistically significant. This indicates that companies that, stated their intended use-of-proceeds to be for repaying debt experience long-run underperformance after going public. These findings are in line with Autore *et al*. (2009) that the issuers declaring debt repayment (making no mention of investment) as their intended use-of-proceeds show underperformance in the long-run. These IPO companies benefit from overvalued stocks by timing IPOs for periods of high returns to pay off their debt. As a consequence, they are more likely to underperform in the long-run.

This study finds that while the INV is positively related to the three-year aftermarket return and strongly statistically significant, the intended use-of-proceeds for debt repayment is ambiguous or without any clear specification. This implies that increased investment expenditures should be viewed favourably as they are associated with higher investment opportunities. These findings are in line with Autore *et al*. (2009)'s assertion that underperformance is stronger when debt repayment is the intended purpose.

In addition, this study finds that $lnSIZE$ and $lnAGE$ are not statistically significant for the performance of SET IPOs in the long-run. These findings are in line with Su and Bangassa (2011) who found no relationship between offer size and three-year *BHAR* based on an event-time approach. For MAI IPOs, the author finds that the offering size of IPOs had an inverse relationship with long-run IPO performance. However, the author also finds that IPO underpricing is negatively and significantly related to a 3-year BHAR for the entire sample and for the SET sample, but insignificant for MAI. This suggests that the larger the initial return of IPOs is, the lower its accumulated after-market return is during the first three years after going public. In particular, a 1% increase in MAIR leads to a decrease of about 0.54% and 0.57% for the Thai IPOs in the 3-year after-market return. This finding supports the studies of Ritter (1991, 1998) and Bradley *et al*. (2009). Thus, the findings lead us to accept ***H7*** as well as the impresario hypothesis. These results are in contrast to the findings of Su (2004), who found that the degree of IPO underpricing is positively related to the after-market return for 250 trading days.

For models (10) to (15), the author finds that the information about government ownership reported in the prospectus is significantly positive, for a 1% increase in government ownership leads to an increase of about 1.50% and 1% in 3-year buy-and-hold abnormal returns for the entire sample and for the SET sample respectively. This

finding implies that issuers with higher government ownership have on average a higher performance in the long-run. Thus, government ownership at the IPO time can be a signal of long-run performance for SET IPOs. As can be seen in Table 3.7, this study has more evidence indicating that the proportions of Thai IPOs subscribed to by foreigners (PFS) and institutional investors (INS) have no effect on the long-run performance of IPOs. For CAR, the same patterns of results hold (see Table 3B in Appendix 3B, Page 122).

3.5 Robustness Tests

According to Rock's model (1986), investors will participate in an IPO endogenously and informed investors tend to only subscribe for IPOs with underpricing. The performance of IPOs is a function of endogenously related ownership variables, and a simple OLS regression may overestimate their explanatory roles (Hamilton and Nickerson, 2003). It seems straightforward to presume that a government ownership variable would be exogenous to a theoretical model. That is, the causal effect is such that ownership structure determines performance. This is because the share issue privatization of Thai companies is an event which fundamentally changes ownership structure and is expected to influence the firm's performance as a result. This is a common presumption where the performance is considered endogenous. However, there is always an empirical question as to whether the model is adequate, and thus whether variables that are theoretically exogenous are in fact endogenous to the system being modeled. Indeed, government ownership and IPO performance could both be endogenous to the Thai post-IPO system. In this section, the author provides more robustness analysis by investigating endogeneity considerations and identification problems.

To avoid the endogeneity problem and a sample selection bias, this study has adopted a two-stage least squares (2SLS) approach to derive unbiased estimates of relationship among government ownership, IPO underpricing, firm quality and primary use-of-proceeds. Firstly, the author regressed the percentage of issues owned by the government or state (GOV) against the exogenous variables UDI, INV, $DEBT$, $lnSIZE$, $lnAGE$, EPS, ROA, ROE and DE, and then regressd the model in Equation (3.2). Table 3.7 presents the 2SLS estimates for all issuers and SET issuers.[43]

[43] The MAI IPOs are not undertaken in consideration for robustness checks due to a lack of state ownership.

Table 3.7 2SLS Estimates - Three-year Buy-and-Hold Abnormal Returns (BHAR)

The regressions are also aimed at testing the relationship between the BHAR and factors of interest: *UDI*: Use-of-Proceeds disclosure index; *DEBT* (*INV*): a dummy variable equal to 1 if the IPO reported use of proceed for repaying debt (investment) equal to 1 and is equal to 0 otherwise; *MAIR*: the market-adjusted initial return or the IPO underpricing; ln*SIZE*: the logarithm of the offer size of IPO firms; ln*AGE*: the natural logarithm of the age of the firm in years from the establishment date to the year of IPO; *GOV*: the proportion of shares owned by the government; EPS: change in the earnings per share from the IPO issue date to the date just prior to the listing date; ROA: the return on assets for the most recent year prior to or in the year of the offering; ROE: the return on equity for the most recent year prior to or in the year of the offering; DE: debt/equity ratio for the most recent year prior to or in the year of the offering; PFS: the percentage of foreigners subscribing for the issues; INS: the percentage of institutions subscribing for the issues; In the first stage, we regress the percentage of issues owned by the government or state (*GOV*) against the exogenous variables *UDI*, *INV*, *DEBT*, *lnSIZE*, *lnAGE*, *EPS*, *ROA*, *ROE* and *DE*. In the second stage, we estimate Equation (2). Statistical significance is corrected for heteroskedasticity using the White heteroskedasticity-consistent standard errors & covariance. The standard errors are shown in the brackets.

Variables	**Entire IPOs**			**SET IPOs**		
	(28) 2SLS β (S.E.)	**(29) 2SLS** β (S.E.)	**(30) 2SLS** β (S.E.)	**(31) 2SLS** β (S.E.)	**(32) 2SLS** β (S.E.)	**(33) 2SLS** β (S.E.)
Constant	1.742	0.927	1.407	0.770	1.546	1.790
	(1.596)	(1.262)	(1.323)	(2.180)	(1.776)	(1.992)
UDI	0.136			0.158		
	(0.061)**			(0.065)**		
INV		0.546			0.429	
		(0.132)***			(0.167)**	
DEBT			-0.377			-0.239
			(0.140)***			(0.162)
MAIR	-0.625	-0.632	-0.663	-0.724	-0.873	-0.922
	(0.210)***	(0.183)***	(0.186)***	(0.230)***	(0.225)***	(0.254)***
lnSIZE	-0.086	-0.088	-0.087	-0.020	-0.115	-0.112
	(0.073)	(0.064)	(0.065)	(0.103)	(0.091)	(0.099)
lnAGE	0.057	0.143*	0.148	0.039	0.217	0.215
	(0.090)	(0.085)*	(0.083)*	(0.109)	(0.109)**	(0.101)**
EPS	0.005	0.003	0.002	0.011	0.009	0.006
	(0.006)	(0.007)		(0.005)**	(0.014)	(0.009)
ROA	-0.843	-0.674	-0.654	-0.945	-1.072	-1.068
	(0.367)**	(0.363)*	(0.375)*	(0.330)**	(0.465)**	(0.370)***
ROE	0.211	0.352	0.364	0.124	0.155	0.168
	(0.200)	(0.179)*	(0.184)**	(0.217)	(0.255)	(0.217)
DE	-0.019	-0.005	-0.015	-0.011	-0.005	-0.015
	(0.018)	(0.020)	(0.018)	(0.016)	(0.029)	(0.018)
PFS	-0.330	0.009	-0.010	-0.766	-0.368	0.693
	(0.481)	(0.538)	(0.546)	(0.680)	(0.928)	(0.511)
INS	0.383	0.481	0.475	0.608	0.733	-0.333
	(0.471)	(0.491)	(0.497)	(0.492)	(0.608)	(0.718)
GOV	1.443	1.097	1.050	1.052	1.422	1.292
	(0.637)	(0.751)	(0.764)	(0.473)**	(0.639)**	(0.747)*
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	190	190	190	133	133	133
Adj. R^2 (%)	12.9	14.4	10.7	22.6	16.6	13.6
F-stats	2.12***	3.928***	3.096***	2.55***	3.427***	2.913***

Note:
* Statistically significant at the 0.01 level.
** Statistically significant at the 0.05 level.
*** Statistically significant at the 0.10 level.

The results for the SET issuers show an insignificant change (robust) in the influence of the underpricing, the intended use of IPO proceeds, government ownership, and the firm and offer characteristics. Apart from the entire sample, the researcher finds no evidence supporting the relationship between government ownership and the long-run performance of IPOs. For SET IPOs, this study shows an insignificant relationship between the intended use-of-proceeds for debt repayment and three-year buy-and-hold abnormal returns.

In addition, to check the effects of the 2006 Military Coup, the author divides the entire sample into 2 samples: the *pre-coup* period (1st January, 2001 to 18th September, 2006) and the post-coup period (19th September 2006 to the end of 2012)[44]. Overall, for the post-coup period IPOs, this study finds evidence supporting underpricing, occurring related to the decreasing proportion of foreigners and institutions subscribing to the new issue, , and the provision of compensation for the expropriation risk faced by individual investors. These findings are in line with the Winner Curse's Model (Rock, 1986) that uninformed investors require IPO underpricing to offset their information disadvantage. The researcher also found that after-market returns such as six-month, one-, two-, three-year buy-and-hold abnormal returns in terms of means were significantly higher during the post-period than before the military coup. In addition, the results show that the use-of-proceeds disclosure index increases from 30.26% in the *pre-coup* period to 34.28% in *post-coup* period and is statistically significant. This indicated that after the military coup IPO companies showed better transparency by disclosing more information about their use-of-proceeds in order to reduce the cost of capital.

3.6 Conclusions

This study examined the impact of endogenous disclosure on the stock market performance of initial public offering (IPO) firms in Thailand and also measured and interpreted the information contained in the IPO prospectus text. The effects of voluntary information disclosures in the prospectus on IPO underpricing and the performance of IPOs in the long-run were examined. This study constructed a use-of-proceeds disclosure index and also develop a classification of 'use-of-proceeds' disclosures that aimed to capture information embedded in the disclosures relating to the purpose (Investment and Debt payments) and amount committed to specific assets. These measures are then related to IPO underpricing, survival prediction and the expected and realized prospects of the IPOs. This study uses a unique methodology and hand-collected data for 245 IPOs from the Stock Exchange of Thailand (SET) and also from the Market for Alternative Investments (MAI) in a 12-year period between 2001 and 2012.

[44] The results of the Thai military coup 2006 effects are not detailed in the Appendix 3C (Page 123). However, this study briefs that the IPO underpricing registered an 18.65% in the pre-coup period and 39.73% in the post-coup period. In addition, the author finds that 6-month, 1-, 2- and 3-year *BHARs* of Thai IPOs going public in *pre-coup* period are -4.50, 0.03%, -11.94% and -16.49% respectively. For the IPOs going public in *post-coup* period, their 6-month, 1-, 2- and 3-year *BHAR*s are 9.53%, 21.84%, 18.55% and 25.13% respectively. However, the proportion of IPO subscribed by foreigners (institutional investors) is 10.13% (20.28%) in the pre-coup period but 3.63% (7.23%) in the post-coup period respectively.

Overall, this study documents a significant association between the level of use-of-proceeds disclosure and IPO underpricing and the long-run performance of IPOs. The analysis of the impact of 'uses of IPO proceeds' using two types of disclosures on three-year aftermarket abnormal returns indicates that an IPO company stating its use-of--proceeds to be for investments performs in the long-run better than IPOs that specify 'Debt Repayment' as their use-of-proceeds. However, when new issuers intend to use the proceeds to repay their bank loan, this study found a significantly negative relationship with the long-run IPO performance. The results show that the *ex-ante* uncertainty and signalling hypotheses partially explain the IPO underpricing phenomenon in the Thai IPO market. In addition, this study supports the impresario hypothesis, as shown by a negative relation between underpricing and three-year aftermarket abnormal returns. Furthermore, the present study finds that government or state ownership in the IPO filing period has a positive impact on the long-run performance of SET IPOs. The researcher documents that the size of the issue, the return on equity and the bull-market conditions are significant determinants of underpricing. Other factors failed to yield significant statistics parameters.

This study has several implications for research and practice. The Thai exchange is a relatively small and thinly traded market but it is quite well integrated into the global financial system. Hence, the results presented in this study may have broader implications for many other small emerging markets, which are also trying to go global by implementing economic, trade and financial reforms. Therefore, the findings may be useful for investors and regulators in many other emerging markets beyond Thailand in terms of short-term and long-term investment planning. IPO firms may choose a number of signalling mechanisms. More specifically, endogenous information disclosure of Intended Use-of-Proceeds may be used as another signalling factor, but it creates a trade-off between the benefits of reducing information asymmetry and the costs associated with revealing information and possible litigation. These findings could be of interest to policy-makers who are continually imposing regulations to curb possible conflicts of interest.

Appendix 3A

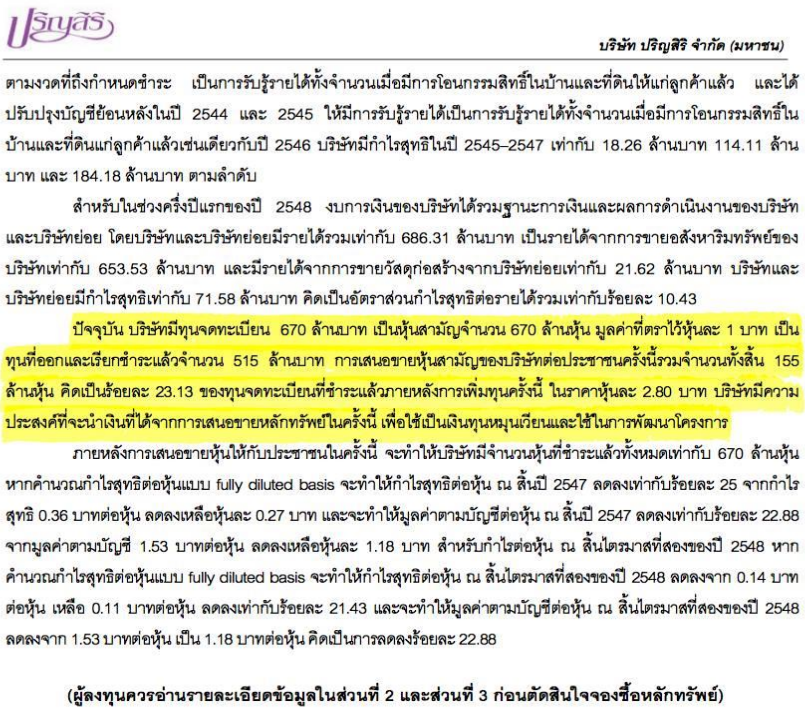
Table 3A The percentage of IPO companies disclosing use-of-proceeds information

	Use-of-Proceed items	%
1.	Working capital (WC) without details	72.7
2.	Working capital with details (including the amount money and the proportion of IPO proceeds used for WC)	20.4
3.	General operation issues (e.g. sales and marketing supports and factories and equipment)	48.2
4.	Research and development	13.5
5.	Service improvement	10.6
6.	Expanding business without or low details	64.5
7.	Expanding business with moderate details (e.g. use the IPO proceeds for which projects)	47.3
8.	Expanding business with more details (e.g. use the IPO proceeds for which projects with amount money)	15.5
9.	Paying down loans without details	43.7
10.	Paying down loans with more details (including the amount money and the proportion of IPO proceeds allocated for debt repayment)	11.0

Examples for use-of-proceeds disclosure index calculation

In order to show how to calculate the disclosure scores in this study, the author selects the information of use-of-proceeds from the 'Executive Summary' section in the IPO prospectuses. However, there is only a Thai version for the prospectus. I have translated the Thai (highlighted in yellow) into English as shown belows:

CASE A: Prinsiri Public Company Limited 'PRIN'



ปริญสิริ

บริษัท ปริญสิริ จำกัด (มหาชน)

ตามงวดที่ถึงกำหนดชำระ เป็นการรับรู้รายได้ทั้งจำนวนเมื่อมีการโอนกรรมสิทธิ์ในบ้านและที่ดินให้แก่ลูกค้าแล้ว และได้ปรับปรุงบัญชีย้อนหลังในปี 2544 และ 2545 ให้มีการรับรู้รายได้เป็นการรับรู้รายได้ทั้งจำนวนเมื่อมีการโอนกรรมสิทธิ์ในบ้านและที่ดินแก่ลูกค้าแล้วเช่นเดียวกับปี 2546 บริษัทมีกำไรสุทธิในปี 2545–2547 เท่ากับ 18.26 ล้านบาท 114.11 ล้านบาท และ 184.18 ล้านบาท ตามลำดับ

สำหรับในช่วงครึ่งปีแรกของปี 2548 งบการเงินของบริษัทได้รวมฐานะการเงินและผลการดำเนินงานของบริษัทและบริษัทย่อย โดยบริษัทและบริษัทย่อยมีรายได้รวมเท่ากับ 686.31 ล้านบาท เป็นรายได้จากการขายอสังหาริมทรัพย์ของบริษัทเท่ากับ 653.53 ล้านบาท และมีรายได้จากการขายวัสดุก่อสร้างจากบริษัทย่อยเท่ากับ 21.62 ล้านบาท บริษัทและบริษัทย่อยมีกำไรสุทธิเท่ากับ 71.58 ล้านบาท คิดเป็นอัตราส่วนกำไรสุทธิต่อรายได้รวมเท่ากับร้อยละ 10.43

ปัจจุบัน บริษัทมีทุนจดทะเบียน 670 ล้านบาท เป็นหุ้นสามัญจำนวน 670 ล้านหุ้น มูลค่าที่ตราไว้หุ้นละ 1 บาท เป็นทุนที่ออกและเรียกชำระแล้วจำนวน 515 ล้านบาท การเสนอขายหุ้นสามัญของบริษัทต่อประชาชนครั้งนี้รวมจำนวนทั้งสิ้น 155 ล้านหุ้น คิดเป็นร้อยละ 23.13 ของทุนจดทะเบียนที่ชำระแล้วภายหลังการเพิ่มทุนครั้งนี้ ในราคาหุ้นละ 2.80 บาท บริษัทมีความประสงค์ที่จะนำเงินที่ได้จากการเสนอขายหลักทรัพย์ในครั้งนี้ เพื่อใช้เป็นเงินทุนหมุนเวียนและใช้ในการพัฒนาโครงการ

ภายหลังการเสนอขายหุ้นให้กับประชาชนในครั้งนี้ จะทำให้บริษัทมีจำนวนหุ้นที่ชำระแล้วทั้งหมดเท่ากับ 670 ล้านหุ้น หากคำนวณกำไรสุทธิต่อหุ้นแบบ fully diluted basis จะทำให้กำไรสุทธิต่อหุ้น ณ สิ้นปี 2547 ลดลงเท่ากับร้อยละ 25 จากกำไรสุทธิ 0.36 บาทต่อหุ้น ลดลงเหลือหุ้นละ 0.27 บาท และจะทำให้มูลค่าตามบัญชีต่อหุ้น ณ สิ้นปี 2547 ลดลงเท่ากับร้อยละ 22.88 จากมูลค่าตามบัญชี 1.53 บาทต่อหุ้น ลดลงเหลือหุ้นละ 1.18 บาท สำหรับกำไรต่อหุ้น ณ สิ้นไตรมาสที่สองของปี 2548 หากคำนวณกำไรสุทธิต่อหุ้นแบบ fully diluted basis จะทำให้กำไรสุทธิต่อหุ้น ณ สิ้นไตรมาสที่สองของปี 2548 ลดลงจาก 0.14 บาทต่อหุ้น เหลือ 0.11 บาทต่อหุ้น ลดลงเท่ากับร้อยละ 21.43 และจะทำให้มูลค่าตามบัญชีต่อหุ้น ณ สิ้นไตรมาสที่สองของปี 2548 ลดลงจาก 1.53 บาทต่อหุ้น เป็น 1.18 บาทต่อหุ้น คิดเป็นการลดลงร้อยละ 22.88

(ผู้ลงทุนควรอ่านรายละเอียดข้อมูลในส่วนที่ 2 และส่วนที่ 3 ก่อนตัดสินใจจองซื้อหลักทรัพย์)

(Source: PRIN's IPO prospectus downloaded from www.sec.or.th)

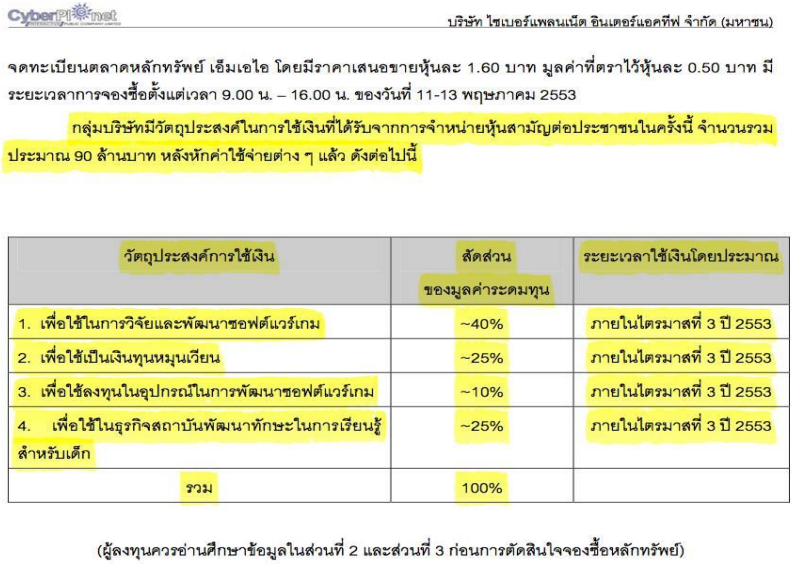
"At present, the Prinsiri Public Company Limited (PRIN) has a fully-paid registered capital worth 670 million Baht or 670,000,000 common stocks (Par value at 1 Baht per a stock). This Initial Public Offering is

a total of 155 million common stocks or 23.13% of paid-up capital. The offer price is 2.80 Baht. The company intends to use its IPO proceeds for working capital and research development." (Unofficial translation)

A list of Use-of-Proceeds: 'PRIN'		Scores
□ General Operation Issues (1 point)		-
■ Research & Development (1 point)		1
□ Service Improvement (1 point)		-
■ Working Capital without details (1 point)	□Working capital with details (2 points)	1
□ Paying down loans without details (1 point)	□ Paying down loans with details (2 points)	-
□ Expanding Business without details (1 point) □ Expanding Business without more details (3 points)	□ Expanding Business without moderate details (2 points)	-
Total (11 scores)		2
Use-of-Proceeds Disclosure Index (UDI)		18.18

Note: see the UDI formula in section 3.3.2 (Page 98-99)

CASE B: Cyber Planet Company Limited 'CYBER'



CyberPlanet บริษัท ไซเบอร์แพลนเน็ต อินเตอร์แอคทีฟ จำกัด (มหาชน)

จดทะเบียนตลาดหลักทรัพย์ เอ็มเอไอ โดยมีราคาเสนอขายหุ้นละ 1.60 บาท มูลค่าที่ตราไว้หุ้นละ 0.50 บาท มีระยะเวลาการจองซื้อตั้งแต่เวลา 9.00 น. – 16.00 น. ของวันที่ 11-13 พฤษภาคม 2553

กลุ่มบริษัทมีวัตถุประสงค์ในการใช้เงินที่ได้รับจากการจำหน่ายหุ้นสามัญต่อประชาชนในครั้งนี้ จำนวนรวมประมาณ 90 ล้านบาท หลังหักค่าใช้จ่ายต่าง ๆ แล้ว ดังต่อไปนี้

วัตถุประสงค์การใช้เงิน	สัดส่วนของมูลค่าระดมทุน	ระยะเวลาใช้เงินโดยประมาณ
1. เพื่อใช้ในการวิจัยและพัฒนาซอฟต์แวร์เกม	~40%	ภายในไตรมาสที่ 3 ปี 2553
2. เพื่อใช้เป็นเงินทุนหมุนเวียน	~25%	ภายในไตรมาสที่ 3 ปี 2553
3. เพื่อใช้ลงทุนในอุปกรณ์ในการพัฒนาซอฟต์แวร์เกม	~10%	ภายในไตรมาสที่ 3 ปี 2553
4. เพื่อใช้ในธุรกิจสถาบันพัฒนาทักษะในการเรียนรู้สำหรับเด็ก	~25%	ภายในไตรมาสที่ 3 ปี 2553
รวม	100%	

(ผู้ลงทุนควรอ่านศึกษาข้อมูลในส่วนที่ 2 และส่วนที่ 3 ก่อนการตัดสินใจจองซื้อหลักทรัพย์)

(Source: CYBER's IPO prospectus downloaded from www.sec.or.th)

"The Cyber Planet Company intends to use the IPO proceeds (about 90 million Bahts after deducting expenditure) to be as follows:" (unofficial translation)

Use-of-Proceeds Purposes	Proportion of offering size (%)	Approximate period of using the proceeds
1. Research and software development	~40%	Quarter 3 in 2010
2. Working capital	~25%	Quarter 3 in 2010
3. Inventment in solfware improvement	~10%	Quarter 3 in 2010
4. Improve the institution of skill development for children	~25%	Quarter 3 in 2010
Total	~100%	

(Investors should research information in sections 2 and 3 before make a decision to subscribe for IPOs)

A list of Use-of-Proceeds: 'CYBER'		Scores
□ General Operation Issues (1 point)		-
■ Research & Development (1 point)		1
■ Service Improvement (1 point)		1
■ Working Capital without details (1 point)	□Working capital with details (2 points)	1
□ Paying down loans without details (1 point)	□ Paying down loans with details (2 points)	-
□ Expanding Business without details (1 point) ■ Expanding Business without more details (3 points)	□ Expanding Business without moderate details (2 points)	3
Total (11 scores)		6
Use-of-Proceeds Disclosure Index (UDI)		54.54

Appendix 3A

CASE C: Ticon Industrial Connection Company Limited 'TICON'

บริษัทประสงค์จะเสนอขายหลักทรัพย์ออกใหม่ให้แก่ประชาชน ผู้ถือหุ้นเดิม และกรรมการและพนักงานที่ได้รับการคัดเลือก ภายหลังจากการได้รับอนุมัติจากสำนักงานคณะกรรมการกำกับหลักทรัพย์และตลาดหลักทรัพย์ ดังมีรายละเอียดต่อไปนี้

1. หุ้นสามัญเพิ่มทุนเสนอขายต่อประชาชนทั่วไป จำนวน 15,000,000 หุ้น มูลค่าที่ตราไว้หุ้นละ 5 บาท ราคาเสนอขายหุ้นละ 21 บาท

2. ใบสำคัญแสดงสิทธิที่จะซื้อหุ้นสามัญ จำนวน 3,750,000 หน่วย ให้แก่ประชาชนทั่วไปที่ซื้อหุ้นสามัญเพิ่มทุนในอัตราส่วน หุ้นสามัญ 4 หุ้น ต่อใบสำคัญแสดงสิทธิ 1 หน่วย ในราคาเสนอขายหน่วยละ 0 บาท

3. ใบสำคัญแสดงสิทธิที่จะซื้อหุ้นสามัญ จำนวน 15,000,000 หน่วย ให้แก่ผู้ถือหุ้นเดิม ในอัตราส่วน 4 หุ้นสามัญเดิมต่อใบสำคัญแสดงสิทธิ 1 หน่วย ในราคาเสนอขายหน่วยละ 0 บาท

4. ใบสำคัญแสดงสิทธิที่จะซื้อหุ้นสามัญ จำนวน 3,750,000 หน่วย ให้แก่กรรมการและพนักงานที่ได้รับการคัดเลือก ในราคาเสนอขายหน่วยละ 0 บาท

ทั้งนี้ ใบสำคัญแสดงสิทธิที่จะซื้อหุ้นสามัญดังกล่าวข้างต้น มีลักษณะ ประเภท เงื่อนไขการใช้สิทธิ ราคาใช้สิทธิ และอัตราการใช้สิทธิเหมือนกันทุกประการ โดยมีลักษณะเป็นใบสำคัญแสดงสิทธิที่จะซื้อหุ้นสามัญ มีอายุใบสำคัญแสดงสิทธิ 5 ปี มีอัตราการใช้สิทธิของใบสำคัญแสดงสิทธิ 1 หน่วย ต่อการใช้สิทธิซื้อหุ้นสามัญ 1 หุ้น ในราคาหุ้นละ 5 บาท

ทั้งนี้ ผู้ถือหุ้นสามัญที่ออกใหม่ของบริษัท มีสิทธิที่จะได้รับเงินปันผลจากผลการดำเนินงาน สิ้นสุดวันที่ 31 ธันวาคม 2545 เป็นต้นไป ซึ่งบริษัทมีนโยบายจ่ายเงินปันผลไม่ต่ำกว่าร้อยละ 40 ของกำไรสุทธิหลังหักภาษี อย่างไรก็ตาม ในการพิจารณาจ่ายเงินปันผล บริษัทจะพิจารณาถึงผลการดำเนินงาน ฐานะการเงิน สภาพคล่อง เงื่อนไขการกู้ยืมเงิน และปัจจัยอื่นๆ ที่เกี่ยวข้อง

ทั้งนี้ บริษัทจะได้รับจำนวนเงินจากการขายหุ้นเพิ่มทุนให้แก่ประชาชนทั่วไป หลังหักค่าใช้จ่ายในการเสนอขายหลักทรัพย์แล้ว เท่ากับ 303.23 ล้านบาท บริษัทมีวัตถุประสงค์ที่จะนำเงินดังกล่าวไปใช้สำหรับเป็นค่าใช้จ่ายในการซื้อที่ดิน การก่อสร้างโรงงานใหม่ และใช้เป็นเงินทุนหมุนเวียน

(ผู้ลงทุนควรอ่านรายละเอียดในส่วนที่ 2 ส่วนที่ 3 และส่วนที่ 4 ก่อนตัดสินใจจองซื้อหลักทรัพย์)

(Source: TICON's IPO prospectus downloaded from www.sec.or.th)

"Ticon Company will receive a total of 303.23 million Baht (which is the fund from investors after offering expenditure has been deducted. The company intends its use of the proceeds to be for buying properties, factory construction and working capital." (Unofficial translation)

A list of Use-of-Proceeds: 'TICON'		Scores
■ General Operation Issues (1 point)		1
□ Research & Development (1 point)		-
□ Service Improvement (1 point)		-
■ Working Capital without details (1 point)	□Working capital with details (2 points)	1
□ Paying down loans without details (1 point)	□ Paying down loans with details (2 points)	-
■ Expanding Business without details (1 point) □ Expanding Business without more details (3 points)	□ Expanding Business without moderate details (2 points)	1
Total (11 scores)		3
Use-of-Proceeds Disclosure Index (UDI)		27.27

Appendix 3B

Table 3B OLS Estimates-Robust and Bootstrap Standard Errors (CARS)

Variables	Entire IPOs						SET IPOs						MAI IPOs					
	(19) OLS		(20) OLS		(21) OLS		(22) OLS		(23) OLS		(24) OLS		(25) OLS		(26) OLS		(27) OLS	
	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]	β	(RSE) [BSE]
Constant	3.019	(1.577)* [1.463]**	2.682	(1.614) [1.448]*	3.118	(1.469) [1.453]**	0.073	(1.773) [1.762]	-0.314	(1.599) [1.837]	0.245	(1.639) [1.792]	8.079	(5.214) [4.973]	8.399	(5.353)* [5.307]	9.333	(5.361)* [5.475]*
UDI	0.014	(0.004)*** [0.004]***					0.019	(0.005)*** [0.005]***					0.012	(0.016) [0.015]				
INV			0.478	(0.116)*** [0.111]***					0.484	(0.132)*** [0.142]***					0.692	(0.406)* [0.389]**		
DEBT					-0.417	(0.111)*** [0.119]***					-0.370	(0.131)*** [0.141]***					-0.648	(0.336)* [0.374]*
MAIR	-0.372	(0.185)** [0.173]**	-0.298	(0.173)* [0.157]*	-0.307	(0.164)* [0.163]*	-0.401	(0.206)** [0.193]**	-0.296	(0.179)* [0.188]*	-0.332	(0.188)* [0.203]*	-0.326	(0.554) [0.518]	-0.377	(0.306) [0.493]	-0.343	(0.389) [0.463]
lnSIZE	-0.135	(0.066) [0.066]	-0.110	(0.067) [0.065]*	-0.120	(0.062) [0.064]*	0.018	(0.086) [0.089]	0.045	(0.079) [0.093]	0.027	(0.081) [0.091]	-0.390	(0.244)* [0.276]	-0.394	(0.211)* [0.288]	-0.424	(0.294)* [0.292]
lnAGE	-0.033	(0.084) [0.082]	0.008	(0.080) [0.075]	0.010	(0.075) [0.081]	-0.026	(0.105) [0.101]	0.022	(0.100) [0.105]	0.015	(0.103) [0.110]	0.178	(0.224) [0.225]	0.155	(0.128) [0.243]	0.148	(0.211) [0.255]
EPS	0.000	(0.006) [0.011]	0.002	(0.007) [0.013]	0.002	(0.006) [0.011]	0.007	(0.006) [0.010]	0.01	(0.005)** [0.010]	0.010	(0.005)** [0.009]	0.030	(0.127) [0.144]	0.001	(2.115) [0.157]	0.004	(0.125) [0.145]
ROA	-0.927	(0.498)* [0.498]*	-0.833	(0.460)* [0.470]*	-0.882	(0.367)* [0.513]	-1.412	(0.452)*** [0.485]***	-1.304	(0.287)*** [0.466]***	-1.309	(0.290)*** [0.553]**	1.148	(2.896) [2.701]	1.301	(0.769) [2.659]	0.937	(1.910) [2.519]
ROE	0.223	(0.250) [0.246]	0.205	(0.234) [0.253]	0.183	(0.192) [0.247]	-0.002	(0.267) [0.302]	-0.008	(0.182) [0.304]	-0.014	(0.183) [0.311]	-1.232	(1.100) [1.813]	-1.092	(0.107) [1.910]	-1.070	(0.754) [1.885]
DE	-0.017	(0.028) [0.027]	-0.016	(0.029) [0.027]	-0.018	(0.021) [0.025]	-0.005	(0.029) [0.028]	-0.008	(0.018) [0.030]	-0.012	(0.017) [0.029]	-0.140	(0.145) [0.156]	-0.093	(1.007) [0.146]	-0.103	(0.102) [0.140]
PFS	0.631	(0.403) [0.430]	0.437	(0.461) [0.483]	0.458	(0.432) [0.510]	-0.296	(0.652) [0.683]	-0.824	(0.663) [0.702]	-0.725	(0.666) [0.714]	0.253	(2.205) [2.069]	0.291	(1.768) [1.965]	0.367	(0.871) [2.498]
INS	0.063	(0.383) [0.386]	0.095	(0.391) [0.366]	0.078	(0.361) [0.386]	0.446	(0.389) [0.388]	0.542	(0.388) [0.415]	0.490	(0.394) [0.436]	0.275	(1.635) [1.553]	0.237	(0.353) [1.448]	0.255	(1.712) [1.293]
GOV	0.952	(0.468)** [0.558]*	0.892	(0.550)* [0.575]	0.956	(0.498)* [0.615]	0.438	(0.335) [0.563]	0.490	(0.307)* [0.634]	0.580	(0.327)* [0.695]						
Year	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
N	190		190		190		133		133		133		57		57		57	
MAX VIF.	5.78		6.05		6.05		5.78		6.05		6.05		5.78		5.81		5.81	
R^2(%)	29.92		31.28		30.05		44.76		42.88		40.19		62.48		67.21		67.01	
F-stats	2.78***		3.41***		3.97***		5.26***		10.65***		20.24***		2.76***		1.87*		1.98**	

Note:

Other estimators shown here include Davidson and MacKinnon's (1993) improved small-sample robust estimators for OLS, cluster-robust estimators useful when errors may be arbitrarily correlated within groups (one application is across time for an individual). *, ** and *** Statistically significant at the 0.01, 0.05 and 0.01 levels respectively. Variance Inflation Factor (VIF) is employed to detect multicollinearity problem and is calculated as 1/(1 - R2) where R2 is obtained from the regression of the variable on all other regressors specified in the model. Robust standard errors (RSE) are reported in parentheses, and bootstrap standard errors (BSE) are reported within brackets.

Appendix 3C

A Robustness check for the Effects of the Military Coup

Table 3C Descriptive statistics on selected variables and different t-test (unequal variance)

The sample consists of 245 IPOs made during the entire sample period (2001-2012). The pre-coup period is the period from Jan 1, 2001 to Sep 19, 2006. The post-coup period is the period from Sep 20, 2006 to Dec 31, 2012.

	Pre-coup period			**Post-coup period**		
	Mean	**Std.**	***N***	**Mean**	**Std.**	***N***
Use-of-Proceeds disclosure index	30.26	14.33	167	34.38**	15.41	78
Market adjusted initial return or IPO underpricing (%)	18.65	38.17	167	39.74***	54.73	78
Six-month buy-and-hold abnormal return (%)	-4.50	41.84	167	9.53**	38.76	61
One-year buy-and-hold abnormal return (%)	0.03	72.52	167	21.84*	78.46	51
Two-year buy-and-hold abnormal return (%)	-11.94	90.50	167	18.55**	85.95	42
Three-year buy-and-hold abnormal return (%)	-16.49	99.74	167	25.13**	95.91	30
The age of firm in years from establishment date to the date of IPO (year)	13.86	10.33	167	17.95**	14.16	78
Offer size of IPO firm (million Baht)	1,190.00	4,213.00	167	952.00	1,914.00	78
The proportion of shares owned by the government (%)	2.87	14.36	167	0.28**	1.57	78
The time-lag between IPO date and the first trading date (day)	12.88	7.48	167	11.53*	4.63	78
Change in the earnings per share from the IPO issue date to the date just prior to the listing date (%)	111.94	576.94	167	20.23*	139.16	78
The return on assets for the most recent year prior to or in the year of the offering (%)	12.98	19.13	167	17.41	28.26	78
The return on equity for the most recent year prior to or in the year of the offering (%)	26.85	37.81	167	29.27	22.96	78
The proportion of IPOs subscribed by foreigners (%)	10.13	13.70	167	3.63***	8.60	78
The proportion of IPOs subscribed by institutions (%)	20.28	19.05	167	7.23***	14.33	78

Notes:
***, **, * Significant difference between the mean of the pre-period sample and the post-period sample at the 0.01, 0.05, and 0.10 levels respectively.

Table 3D Regression results with the IPO underpricing and performance of IPOs in the long-run return as the dependent variables and regression analysis of the impact of the Thai military coup in 2006

The sample consists of IPOs made during the post-period dummy or *POST* is 1(0) if the issues were offered during Dec 19, 2006 - Dec 31, 2012 (otherwise). *DEBT* (*INV*): a dummy variable equal to 1 if the IPO reported use of proceed for repaying debt (investment) equal to 1 and is equal to 0 otherwise; *MAIR*: the market-adjusted initial return or the IPO underpricing; ln*SIZE*: the logarithm of the offer size of IPO firms; ln*AGE*: the natural logarithm of the age of the firm in years from the establishment date to the year of IPO; *LAG*: the time-lag between IPO date and the first trading date; *GOV*: the proportion of shares owned by the government; EPS: change in the earnings per share from the IPO issue date to the date just prior to the listing date; ROA: the return on assets for the most recent year prior to or in the year of the offering; ROE: the return on equity for the most recent year prior to or in the year of the offering; DE: debt/equity ratio for the most recent year prior to or in the year of the offering; *BULL*: a dummy which is coded as 1 when a firm issued IPO stock in a bull market measured by the change in the SET index in a 3-month period before IPO issues and 0 otherwise; PFS: the percentage of foreigners subscribing for the issues; INS: the percentage of institutions subscribing for the issues. Statistical significance is corrected for heteroskedasticity. The robust standard errors are shown in the brackets.

Explanatory variables	**IPO underpricing**				**Long-run performance of IPO**			
	(23) OLS		**(24) OLS**		**(25) OLS**		**(26) OLS**	
	Coefficient	Robust S.E.	Coefficient	Robust S.E.	Coefficient	Robust S.E.	Coefficient	Robust S.E.
Constant	1.270	(0.570)**	1.216	(0.562)**	2.623	(1.603)*	3.232	(1.655)**
POST	0.186	(0.072)**	0.184	0.072)**	0.338	(0.208)*	0.358	(0.215)*
INV (1 if IPO stated use of proceed for investment)	-0.064	(0.057)			0.512	(0.135)		
DEBT (1 if IPO stated use of proceed for debt repayment)			0.069	(0.059)			-0.357	(0.137)**
MAIR					-0.511	(0.201)**	-0.548	(0.202)***
lnSIZE	-0.071	(0.029)**	-0.071	(0.029)**	-0.115	(0.072)	-0.123	(0.073)
lnAGE	0.040	(0.040)	0.040	(0.040)	0.070	(0.084)	0.069	(0.084)
LAG	-0.001	(0.004)	-0.001	(0.004)	-0.016	(0.007)*	-0.016	(0.008)**
EPS	0.003	(0.006)	0.003	(0.006)	0.007	(0.009)	0.007	(0.008)
ROA	0.159	(0.189)	0.161	(0.187)	-0.673	(0.429)	-0.662	(0.448)
ROE	0.128	(0.131)	0.130	(0.131)	0.262	(0.210)	0.260	(0.218)
DE	-0.009	(0.007)	-0.009	(0.006)	0.009	(0.025)	0.000	(0.021)
PFS	0.038	(0.277)	0.034	(0.277)	0.130	(0.458)	0.131	(0.455)
INS	-0.183	(0.186)	-0.185	(0.186)	0.552	(0.448)	0.555	(0.453)
GOV	0.194	(0.185)	0.207	(0.191)	1.494	(0.767)*	1.451	(0.801)*
BULL	0.124	(0.057)**	0.123	(0.057)**	-0.188	(0.156)	-0.158	(0.156)
Year dummies	No		No		No		No	
Industry dummies	Yes		Yes		Yes		Yes	
N	237		237		192		192	
Adjusted R^2	0.108		0.109		0.200		0.169	
F-statistics	2.43**		2.44**		3.27***		2.84***	
MAX VIF	5.81		5.82		5.83		5.82	

Note:
* Statistically significant at the 0.01 level, ** Statistically significant at the 0.05 level and *** Statistically significant at the 0.10 level.

CHAPTER 4

IPOs' SIGNALLING EFFECTS FOR SPECULATIVE STOCK DETECTION

Chapter 4

IPOs' Signalling Effects for Speculative Stock Detection

4.1 Introduction

The manipulation of securities' prices has been a major concern in recent decades. The fact that stock markets can be manipulated is an important issue for both trading regulation and market efficiency. In general, securities' regulators prohibit market manipulation because it distorts prices, hampers price discovery and creates dead-weight losses (Huang and Cheng, 2013). According to the Securities and Exchange Commission (SEC), Thailand, manipulation of the securities' price can detrimentally damage investor and public confidence in the capital market. Such stock price manipulation may lead to a number of speculative stocks being traded on the global stock exchange.

Yet there is a considerable amount of speculative stocks being traded in the various stock markets. Although they may vary slightly in characteristics and criteria from country to country, a general definition of speculative stocks is those with a high risk relative to any potential positive returns. A speculative stock may offer the possibility of substantial returns to compensate for its higher risk profile. Speculative stocks are favoured by speculators and investors because of their high-reward, high-risk characteristics. Recent studies in behavioural finance indicate that certain investors, especially some retail investors, are drawn toward stocks with speculative features such as high skewness and high volatility (Kumar, 2009; Dorn and Huberman, 2010). Speculative stocks are often purchased by risk-seekers or investors who ignore detailed analysis and believe the stock will appreciate in value. For example, 'a penny stock[45]' in the U.S. market is one of best-known speculative stocks. For the UK, the term 'a penny share' refers to stock in a company with a small market capitalization (small-cap), or less than £100 million and/or with a stock price of less than £1.00. Such companies have a small amount of tangible assets and a short performing history. As a result, the most favourable place for trading

[45] A penny stock is defined as a stock that is traded for less than $5.00 per share. Penny stocks are high-risk and low-priced and are usually issued by new or growing companies with limited cash or resources. They are called 'penny stocks' because originally in the past their price was less than a dollar per share; the SEC later modified the penny stock definition to include all shares trading below $5.00. However, at the present time penny stocks are often traded for under $1.00 per share, although they may be priced at up to $5.00 per share.

penny shares is the Alternative Investment Market (AIM)[46]. Penny stock IPOs appear to be particularly well suited for investigating issues involving market manipulation and informational asymmetries (Bradley *et al*., 2006). Other features of speculative stocks[47] are that they have low prices, small capitalizations and less liquidity. Such characteristics may assist stock manipulators to pump and dump these particular share prices more easily.

An important question is to identify the determinants of speculative stocks and understand why some stocks are more speculative than others. One of the potential reasons is the difficulty and subjectivity of defining their intrinsic values (Baker and Wurgler, 2006). For example, in the case of a young firm, currently unprofitable but with a potentially extremely profitable growth, the combination of its no-earnings history and a highly uncertain future allow investors to defend valuations ranging from much too low to much too high, as befits their prevailing sentiment. Seemingly, IPO stocks have some features that are more likely to be speculated rather than others due to a lack of public information such as historical price data and company news. Hong *et al*. (2006) also suggest that most of the earlier speculative manias were also most prominent for IPOs. Therefore, IPOs should transmit some signals identifying speculative stocks in the secondary market.

The Stock Exchange of Thailand (SET) is unique in that, unlike other exchanges, it is comparatively new. Moreover, the SET has its own particular rules and regulations. Interestingly, investors in the Thai stock market do not pay taxes when making profits from trading securities (Capital Gains Tax: CGT)[48]. On the other hand, they pay about 10% tax if they receive dividends. As a result, most of the individual investors in the Thai stock market prefer to purchase and speculate in common stocks rather than invest in them for a long horizon period to receive dividends. In Thailand there is also only a mild

[46] AIM was launched in 1995 by the LSE and it is also the London Stock Exchange's international market for smaller growing companies as well as for young and recovering companies. The objective of AIM is to offer small firms, from any country and any industry sector, the opportunity to raise capital in the market.

[47] Sindell (2005) indicates that it is not difficult to identify speculative stocks because they frequently have a price/earnings (P/E) ratio twice as high as that of other stocks.

[48] Capital gains tax (CGT) is a tax on capital gains. In general, most of capital gains come from sales of common stocks, bonds, precious metals and property. Several countries impose capital gains tax but have different rates of taxation for individuals and corporations. For example, there is a 25% CGT in Austria. In Brazil, the CGTs are normally 15%, except for day-trading (Net-settlement) when it is 20%. Canadian CGT is currently up to 50% calculated by capital gains (profit) × 50% × marginal tax rate. The CGTs in Ireland, Mexico, Norway, Philippines, Poland and Romania are 20%, 10%, 28%, 6%, 19% and 16% respectively. However, there are some countries such as Ecuador, Iran, Jamaica, Kenya, India (for long-term capital gain from common stocks), New Zealand, Singapore, and Thailand that do not impose CGT.

penalty and there are problems of law enforcement in cases of stock price manipulation[49]. In addition to this, there is no *Casino* in Thailand because gambling is illegal. Consequently, the Thai stock market is in fact one of the best targets for various manipulators (stock-price fixers) and speculators leading to many speculative stocks being traded on the SET.

In recent decades, the SET has also been suffering from a number of speculative stocks. As a result, many investors have lost considerable sums of money by rashly dabbling in speculative stocks. In 2004, the Securities and Exchange Commission, Thailand, introduced a new regulation, namely, the 'Turnover List' to signal to all investors the risks associated with trading in such securities. The SEC also intervened in the trading of Turnover List stocks by controlling the trading volume. Turnover List stock (TOL) is the common stock that has a high speculation but a poor performance. It is mostly common stock from a low-quality company, whereas blue-chip stocks, for example, have never been on the TOL. The SET and SEC clearly see the TOL as a means of forestalling speculative gains by Thai investors.

In this chapter, the author examines the determinants of speculative stocks listed on the Stock Exchange of Thailand (SET) and the Market for Alternative Investment (MAI) between 2004 and 2012. Using IPO signalling, market-feedback and price manipulation models, this study investigates the nature and extent of the initial returns of IPOs and after-market returns to explain the probability of stocks appearing on the Turnover List. To carry out this investigation, the author constructs a cross-section of IPOs listed on the SET and MAI, and TOL within one year of the IPO data, both collected from the SEC database. The analysis covers 187 IPOs for the period between 2004 and 2012. Furthermore, this study considers both IPOs and existing Thai stocks and examines the role of both abnormal returns and trading volume in the transmission of probability for appearing on the TOL. The author constructs a unique panel dataset, consisting of 429 Thai stocks, excluding financial companies, real estate investment trusts and closed-end investment funds, for the same period. In addition, this study controls for the heterogeneous characteristics of a firm's balance-sheet that relate to the firm's size, age, trading volume, and ownership structure.

[49] Under the Securities and Exchange Commission (Thailand) Acts, 'Stock manipulation' is considered as criminal action. Anyone who commits such crime shall be imprisoned not more than two years or be fined from 500,000 Baht to double the benefit earned due to a deceptive practice causing damages to investors.

The organization of this chapter is as follows: Sections 4.2 and 4.3 introduce a Turnover List framework and related literature respectively; Section 4.4 presents econometric methodology and research models; Section 4.5 discusses the data and summary statistics; Section 4.6 reports the empirical findings and robustness checks; Section 4.7 concludes the chapter.

4.2 Turnover List Framework

The Turnover List (TOL) is an instrument identifying speculative stock features to warn investors who are trading shares on the SET. It is similar to other exchanges that have various implements to signal to their investors about some kinds of inferior stock. For example, there is a "Special Treatment (ST)[50]" sign for stocks in danger of being delisted in the Chinese stock market. In Malaysia, "A practice note (PN17)[51]" is a tool to preserve individual investors. PN17 stands for Practice Note 17/2005 and is promulgated by the Malaysian Stock Exchange. The PN17 is designated to a listed company that has financial problems or fails to meet minimum capital or equity (less than 25% of the paid-up capital). In order to maintain listed company status, PN17 companies are compelled to submit a proposal to the Approving Authority to restructure and revive their companies.

4.2.1 Turnover List Identifications

According to the SEC Thailand database, the Turnover List regulations were established in 2004 and applied particularly to the Thai stock market. The purpose of the Turnover List is to disclose the list of securities that have a high turnover ratio and might lead to abnormal trading and settlement risk. The Turnover List is intended to warn both investors and brokers against the risks associated with trading in such securities. Accordingly the common stocks on the Turnover List, published by the SEC (Thailand), are speculative stocks. These are identified as follows:

[50] The summaries of ST criteria are as follows: 1. A listed company has losses (negative net earnings) for 2 consecutive years; 2. Shareholder equity is lower than registered capital in the last fiscal year; 3. Firm auditors issue negative opinions. The Shenzhen Stock Exchange has similar ST criteria.

[51] A listed company is classified as a PN17 company are as follows: 1.The shareholders equity of the listed issuer on a consolidated basis is 25% or less of the issued and paid-up capital (excluding treasury shares) of the listed issuer and such shareholders equity is less than RM40 million; 2. Receivers or managers have been appointed over the asset of the listed issuer, its subsidiary or associated company which asset accounts for at least 50% of the total assets employed of the listed issuer on a consolidated basis; 3. The auditors have a negative opinion in audited financial statements; 4. The listed company or its subsidiary defaults on debt; and 5. The listed company has been suspended.

$$\%\mathbf{1W-Turnover} = \left[\frac{\boldsymbol{DAT}\times\mathbf{5}}{\%\boldsymbol{FF}\times\boldsymbol{DAMC}}\right]\times\mathbf{100} \quad (4.1)$$

where, 1 % W-Turnover is the turnover in a one-week period and %*FF* is the percentage of the free-float**.** The daily average market capitalisation during the week is *DAMC*, and *DAT* is obtained from the average daily trading value during the week.

$$\%\boldsymbol{FF} = \left[\frac{\boldsymbol{TOTAL-NUMSS}}{\boldsymbol{TOTAL}}\right]\times\mathbf{100} \quad (4.2)$$

and

$$\boldsymbol{DAMC} = \left[\frac{\sum_{t=1}^{5}\boldsymbol{DMC_t}}{\boldsymbol{NUMDAY}}\right] \quad (4.3)$$

where, *TOTAL* denotes the total number of common shares in each company; *NUMSS* is the number of shares held by strategic shareholders; *DMC* is the daily market capitalisation and the trading day during the week; *NUMDAY* is the number of the trading day during the period of a week excluding any day on which a suspend sign (SP) is imposed for the whole day. In each week the Thai stocks are identified using Equation (4.1) at one time, when any common stocks are in line with the Turnover List criteria shown in Table 4.1. It will thus be declared to be a Turnover List stock (TOL) by the SEC (Thailand). Currently, there is a total of 579 listed-companies on the Thai stock market. However, the stocks of 218 firms (37.65%) have been placed on the Turnover List. The researcher can also confirm that blue chip stocks have never been on the Turnover List.

Table 4.1 The criteria of the Turnover List for common stocks in SET and MAI

Common stocks in SET	
	Criteria
Stocks in Turnover list	- Weekly turnover ratio (1W-Turnover) ≥ 30% and - Average daily trading value in 1 week ≥ 100% million Baht - No more than the first 50 stocks
Stocks which are obliged to be reported to the SEC	- Stocks in the Turnover List with a P/E ratio over 100 times or a net loss or in the REHABCO sector
Common stocks in MAI	
	Criteria
Stocks in the Turnover List	- Weekly turnover ratio (1W-Turnover) ≥ 30% and - Average daily trading value in 1 week ≥ 20% million Baht - No more than the first 5 stocks

Note:
Newly listed securities (IPO) with trading of less than 4 weeks are excluded from the analysis.
There is now no limit for a number of shares to be listed on Turnover List.

4.2.2 Turnover List Announcement and Enforcement

In general, the Turnover List is announced every Friday by the SEC (Thailand). The data obtained to identify the Turnover list span a period of five trading days and are seen in Figure 4.1. Importantly, under the SEC Turnover List regulations, investors who wish to trade in any high trading stock on the SEC Turnover List and SET criteria have to open a Cash Balance Account instead of using a Net settlement and Margin trading[52] and they are also obliged to deposit the full amount of cash (100%) before their orders are executed.

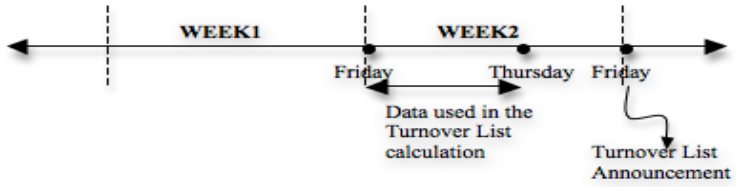


Figure 4.1 The time line indicates the data used in the Turnover List calculation and announcement

The SET indicates that securities companies (brokers) must advise their customers when trading TOL stocks. The TOL regulation comes into effect the day following the TOL announcement and for at least the following 3 weeks. In cases when the stock is on the TOL, brokers will not allow it to be traded by net-settlement and margin trading until the stock is released from the Turnover List.

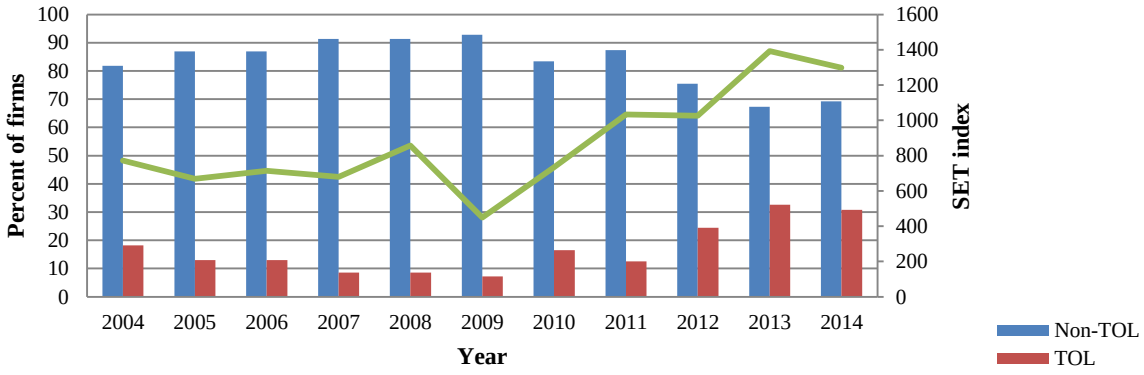


Figure 4.2 The proportion of Turnover List and Non-Turnover List stocks on the Thai stock market (during the period 2004-2014)

[52] According to Fred Tomczyk, CEO of online brokerage firm TD Ameritrade (http://money.cnn.com/news/), defined margin trading as "buying on margin" or borrowing money to purchase stock. He also noted that buying on margin is a game of high risk and high reward, as gains as well as losses are amplified.

The proportions of TOL and non-TOL stocks on the SET between 2004 and 2014 with the stock market sentiment are reported in Figure 4.2. It can be seen that the percentage of TOL stocks dramatically increased from 8% in 2009 to 30% in 2014. This indicates that the stock market movement or the bull-market condition may affect the risk of being put on the Turnover List.

4.3 Related Literature

In this chapter, the author aims to understand whether IPO underpricing and after-market returns affect the likelihood of a stock being classified as speculative at a later stage. This study focuses on asymmetric information models. In particular, the researcher considers three main theoretical models to explain speculative stock: IPO signalling, market-feedback and price manipulation models.

4.3.1 IPO Signalling Model

One of the relevant features of IPOs is their tendency to be underpriced. There is an ever-increasing literature explaining this phenomenon (Ritter and Welch, 2002). A well-known strand of theoretical literature focused on explaining IPO underpricing using signalling models (e.g., Ibbotson, 1975; Allen and Faulhaber, 1989; Grinblatt and Hwang, 1989; Welch, 1989). To be more specific, signalling models are derived from the concept of asymmetric information[53] and assume that the issuing firm has an informational advantage, compared to the underwriters or investors. For example, issuers have private information about the present value and the risk of its future cash flows, knowledge that is not available to the investors. Thus, high-quality firms are willing to bear the cost of such signalling (i.e. using underpricing as a signal of the firm's quality) to differentiate themselves to investors from low-quality firms. Here Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989) presumed that underpricing allows "good" firms to distinguish themselves from "bad" ones and to improve their external financing in the future. If this strategy is successful, then high-quality firms will be able to return to the market by releasing future equity issues after their IPOs. In common with many other

[53] 'The 'winner's curse model' by Rock (1986) is well-known as an asymmetric information model. Again, the assumption is that there are two types of investors, namely, informed and uninformed investors. 'Informed investors' such as underwriters and issuing firms are better informed about the true value of the stocks on offer than general and individual investors. Informed investors invest only in attractively priced IPOs while uninformed investors invest randomly.

signalling models, high-quality companies demonstrate that they are high-quality by throwing money around. One way to do this is to "leave money on the table in the IPO" (Ritter and Welch, 2002). According to Su and Fleisher (1999, p. 181) "The best a low-value issuer can do is to 'take the money and run' when its stock is initially offered". A high-quality company will find it advantageous to signal its IPO through underpricing while a low-quality company will not find such underpricing worthwhile[54].

There are several empirical works that have investigated and contributed to the signalling models of IPOs. For example, Jegadeesh *et al*. 1993, Su and Fleisher (1999) and Kennedy *et al*. (2006) found a positive relationship between underpricing and the likelihood of seasoned equity offerings (SEO). In contrast, Yu and Tse (2006) found no evidence to support the signalling hypothesis. Michaely and Shaw (1994) showed that companies with less IPO underpricing generated better earnings and paid higher dividends.

More recently, a number of authors have studied whether IPO underpricing affects the probability of IPO survival and voluntary delisting from the stock market. Kooli and Meknassi (2007), for example, examined the survival profile of IPO issuers listed during 1985-2005 in the U.S. They reported that large IPOs have a lower likelihood of failing when compared to small IPOs, and IPO underpricing increases the probability of failure. However, Espenlaub *et al*. (2012) and Pour and Lasfer (2013) focused on the AIM IPOs in the U.K. market and found no relationship between IPO underpricing and IPO survival. Most of the prior findings suggest that IPO underpricing is explainable as a means of bribing bureaucrats and can be understood in terms of establishing equilibrium when there is asymmetric information: in such a situation underpricing is a useful strategy for companies to signal their value to investors. In another study, Ellul and Pagano (2006)[55] suggested that the IPO underpricing is generally explained by asymmetric information and risk. The less liquid the aftermarket is expected to be, and the less predictable its liquidity, the larger will be the IPO underpricing. It can be seen from a number of IPO studies that IPO underpricing has been employed to verify the quality of firms in various

[54] Several empirical researchers have shown there to be a positive relationship between the IPO underpricing and the likelihood of seasoned equity offerings (SEO). For example, Ljungqvist (2004) suggested the possibility of distinguishing between good and bad firms, claiming that a company's true type is revealed to investors before the post-IPO financing stage. This exposes bad issuers to the risk that any cheating on their part will be detected before they can reap the benefit from aping high-quality issuers' signals.

[55] Ellul and Pagano (2006) studied 337 British IPOs going public between 1998 and 2000 using various measures of liquidity. They find that expected after-market liquidity and liquidity risk are important determinants of IPO underpricing.

ways (Jegadeesh *et al*., 1993; Su and Fleisher, 1999; Kennedy *et al*., 2006; Kooli and Meknassi, 2007; Espenlaub *et al*., 2012; Pour and Lasfer, 2013 and among others).

In short, signalling theory indicates a clear relationship between IPO underpricing and the probability of being TOL stocks. However, the researcher does not have a strong view on the sign of the IPO underpricing coefficients, as it may be a signal of the quality of firms or of higher *ex-ante* uncertainty. For example, concerning the quality of firms, in such circumstances, one may expect that firms with lower IPO underpricing are more likely to appear on the TOL (e.g., Jegadeesh *et al*. 1993; Su and Fleisher, 1999; Kennedy *et al*., 2006). On the other hand, higher IPO underpricing may signal higher *ex-ante* uncertainty at the time of the offering that may lead to a higher probability of failure in the aftermarket (Beatty and Ritter, 1996; Kooli, 2007).

4.3.2 Market-Feedback Hypothesis

Next, the researcher considers the market-feedback hypothesis where IPO prices are a weighted average of the perceived present values of high-value and low-value issuers. In contrast to the signalling models, the market-feedback hypothesis assumes that the market is better informed than the issuer and then that a high return in the IPO period implies that the issuer has underestimated the marginal return on the project. Under the market-feedback hypothesis, the IPO price *per se* is not informative but the initial return on IPOs provides a measure of the extent to which the market is able to discriminate high-value companies from low-value ones (Jegadeesh *et al*., 1993). Moreover, Bommel and Vermaelen (2003) tested the market-feedback hypothesis which states that during the IPO process valuable information is collected and channelled to the company's managers. They compared the variances of the indicative underpricing with those of the final underpricing. The decrease in the average pricing error between the filing date and the pricing meeting shows the merit of the 'book-building exercise' and suggested that important information is aggregated in the waiting-period. In short, for the market feedback model (Jegadeesh *et al*., 1993; Bommel, 2002; Bommel and Vermaelen, 2003), investors are better informed about the firm's value than the managers themselves. The owner-managers select the amount of IPO, setting the offer price to maximize information production by informed investors. As a consequence, the intrinsic value of the company is exposed to managers by the post-IPO price (Kennedy *et al*., 2006). In addition to the IPO signaling models, several researchers test the market-feedback

hypotheses simultaneously. For instance, Jegadeesh *et al*. (1993), Su and Fleisher (1999), Huyghebaert and Hulle (2006), Kennedy *et al*. (2006) and Yu and Tse (2006) find that the abnormal returns after going public are significantly positively related to the likelihood of subsequent SEOs. In another study, Pour and Lasfer (2013) report that firms that have lower stock returns in the post-IPO period are more likely to delist but the magnitude of underpricing is not significant. These results imply that the initial return of IPOs does not play a unique role in distinguishing a company's quality.

Consequently, the author expects to find a higher probability of a firm appearing on the Turnover List if the market discovers their true quality or when information is revealed when after-market trading starts and price differentiation occurs. Based on the alternative "market-feedback" hypothesis, this study also employs the aftermarket abnormal return as a potential explanation of Turnover List participation and compares TOL prediction to the IPO signalling hypotheses.

4.3.3 The Asymmetric Information and Price Manipulation Hypothesis

Firms that have an IPO period of time (from the filing date to the beginning of the trading period in the secondary market) have large information asymmetry due to the lack of public information such as historical price data and company news. Uninformed investors may therefore base their trading activities on publicly observable information such as past stock and market returns (Chiou *et al*., 2007). As a result, they aim to seek company information, especially in the initial IPO trading period. On this subject, Aggarwal and Wu (2006) suggested that "potentially informed investors" such as corporate insiders, brokers, underwriters, large shareholders and market makers are likely to be manipulators. They also showed that returns from manipulation are higher when there are more information-seekers in the market. During the IPO period a market-maker is able to manipulate the share price more easily because both market-maker and underwriter use their privileged positions to restrict supply while using their brokerage to create demand from individual investors. A well-known example of IPO price manipulation is the case of the 'Paravant Computer Systems Company[56]'. Some relevant studies show that most of

[56] Aggarwal and Wu (2006) gave an example of straightforward manipulation of IPO pricing. In June1996, Paravant Computer Systems, Inc. was listed on the NASDAQ market and issued their IPO assisted by the underwriter "Duke & Company". The offered price was $5.00 per share. On June 3, 1996, the IPO increased to $9.875 per share on the first trading day. The SEC alleged that Duke (a market-maker for Paravant securities) created a significant demand for common stock. Interestingly, the CEO of Duke (Victor M. Wang) was associated with a large allocated proportion of Paravant IPOs. Duke also had a larger supply of these IPOs in its inventory. Prior to this IPO, several representatives

the earlier speculative manias were most prominent for new issues with a limited asset float[57] (Malkiel, 2003 and Hong *et al*., 2006). In addition, the findings of Hong *et al*. (2006) suggest that IPO underpricing attracts a larger number of market participants to the shares. More investors mean better risk-sharing, which leads to a larger bubble. Therefore, the author conjectures that IPOs are more likely to become Turnover List stocks than non-IPOs.

Most of the previous empirical studies on the IPO signaling theories and the market-feedback model have paid attention to the fact that the underpricing and the after-market returns can signal 'good' or 'bad' quality companies. For example, a strand of previous studies on IPOs has claimed that IPO underpricing is being employed to verify the quality of firms. To his knowledge, the researcher is the first to analyze this unusual form of speculative stock on the so-called 'Turnover List' (TOL) in the Thai SEC setting. The questions of what exactly is a signalling of TOL stocks or how investors can avoid investment in bad or speculative stocks have important implications for a firm's stakeholders, especially for retail, foreign and institutional investors. As a consequence, this study suggests IPO signalling as a means of detecting speculative stocks. Investors are therefore interested in the likelihood of their stocks being TOL ones.

4.4 Econometric Methodology and Research Models

In what follows, this study first presents a logit model, considering a set of potential determinants of a Thai IPO becoming a Turnover List stock. Next, the author examines the relationship between the stock price reactions to the announcement of the first TOL. Finally, this study extends the sample to include all listed Thai companies and tests with a panel logistic regression model whether a firm's characteristics influence the probability of its stock being speculated.

from Duke & Co. offered customers the chance to buy Paravant common stocks once aftermarket trading had commenced to ensure demand for this stock. As a result, the artificially small supply of common stock created demand and, once after-market trading commenced, the price of Paravent stock rose. On June 4, 1996, the stock price had increased to between $10.75 and $13.375 per share. Finally, the manipulation ceased on June 21, 1996, by which time Duke had generated over $10 million in illegal profits.

[57] Several firms were recent IPOs, and generally their shares were locked up shares, which held by insiders, managers and other pre-IPO equity shareholders, and are tradable for at least 6 months after the IPO date.

4.4.1 The Probability of Turnover List and IPO Underpricing

This study investigates whether the probability of a Thai IPO becoming a Turnover List stock is related to the signalling model of IPOs and to the market-feedback hypothesis, by estimating the following logit model:

$$\ln\left[\frac{P_i^{TOL}}{(1-P_i^{TOL})}\right] = \beta_0 + \beta_1 MAIR_i + \beta_2 BHAR_i + \beta_3 lnSIZE_i + \beta_4 lnAGE_i + \beta_5 GOV_i + \beta_6 lnPFS_i + \beta_7 INS_i + \sum_{j=8}^{15}\beta_j YEAR + \sum_{k=16}^{22}\beta_k INDUSTRY_i + \varepsilon_i \quad (4.4)$$

where P_{it} is the probability that the Turnover List (TOL) variable is equal to 1. *MAIR* is the market-adjusted initial return (*MAIR*) or the IPO underpricing. $MAIR_i$ is calculated by $[(P_{i,1}-P_{i,0})/P_{i,0}] - R_{i,m}$ or the percentage change between the offer price and the IPO closing price on the first trading day. $P_{i,1}$ is the closing price on the first day of trading, $P_{i,0}$ is the IPO offering price, and $R_{i,m}$ is the stock market (either the SET or the MAI depending on which is the listed exchange) index return from the IPO date to the first trading date. Under the IPO signalling model, the researcher expects that there is a negative relationship between the IPO underpricing and the likelihood of being on the TOL. *BHAR* represents 6-month post-abnormal returns for the IPOs. To test the market feedback hypothesis, the author uses the abnormal returns over the period from trading day 1 to trading month 6 following the IPO date because it corresponds to the average silent (locked-up) period for strategic shareholders in the Thai stock market. The author expects that they will sell their IPOs or reduce their share proportion immediately after the silent period, particularly in cases of bad issuers (low-value companies) going to the public because they know the true value of their companies. This study controls for potential size and age differences in TOL activity. Thus, the author include the natural logarithm of offer size of IPO firms (ln*SIZE*) and the natural logarithm of the age of the firm in years from the establishment date to the year of IPO (ln*AGE*) in the regression models. Moreover, the proportion owned by the government (*GOV*) is employed in the model for an additional signal. This study also considers interesting variables namely, the IPO subscription rates that have not been studied closely in previous IPO empirical works. These explanatory variables are *PFS* (the percentage of foreigners subscribing for the IPOs) and *INS* (the percentage of institutional investors subscribing for the IPOs). Other variables include *YEAR* and *INDUSTRY* for controlling each year's conditions and

industry effects. ε_i is the regression error term. Alternatively, as noted in equation 4, this model can be written in the following non-linear-in-the-parameters form:

$$P_i = \frac{e^{\propto + x'_i\beta + U_i}}{1 + \propto + x'_i\beta + U_i}, \tag{4.5}$$

where, P_i is the probability that the i^{th} firm becomes a TOL item and x_i is the column vector of explanatory variables.

Again, the three independent variables of primary interest are the IPO underpricing (*MAIR*), the abnormal-returns in 6-month periods after going public (*BHAR*) and the proportion of IPOs owned by the Thai government (*GOV*). Moreover, in logit models the author can examine the effect of a one-unit change in an explanatory variable that *TOL* = 1 by considering the derivative, which is generally called the marginal effect[58]:

$$\frac{dP}{dx} = \Phi(\beta_1 + \beta_2 x)\beta_2 \tag{4.6}$$

4.4.2 Market Anticipation of Turnover List

The relationship between the stock price reaction to the announcement of the first Turnover List and IPO underpricing and the aftermarket abnormal return was examined. The researcher expected in accordance with the signalling hypotheses the market to be more surprised by the TOL announcement for IPOs with lower underpricing (low-quality firms), and the author then expected the price decline, normally associated with speculative stock announcements, to be less severe for high-quality firms. To test these implications of the IPO signalling model and of the market-feedback hypothesis in this study, the researcher regressed the abnormal 5-day returns due to the TOL announcement against the independent variables used in the previous regression. In general, one strategy is to ignore the companies which have ever been on the Turnover List, omit them from the sample, and then use the least squares to estimate a stock price reaction equation for

[58] For logit models, this interpretation would be incorrect because the form of the function is not $P_i = \beta_i + \beta_2 x_i + u_i$, for example, but rather $P_i = F(x_{2i})$, where F represents the non-linear logistic function. To obtain the required relationship between change in x_{2i} and P_i, I would need to differentiate F with respect to x_{2i} and it turns out that this derivative is $\beta_2 F(x_{2i})$. Then in fact, a 1-unit increase in x_{2i} will cause a $\beta_2 F(x_{2i})$ increase in probability. In general, these impacts of incremental changes, being explanatory variables are evaluated by setting each of them to their mean values.

those that are speculative stocks. However, the author would face a 'sample selection problem' if he considered or collected data on only firms that are on the Turnover List. The estimator is probably inconsistent as a result of truncation bias.[59] Eckbo *et al*. (1990) suggest deriving consistent estimators using a latent variable model. Michaely and Shaw (1994) and Yu and Tse (2006) also applied this method to detect the dividend announcement and seasoned equity announcement effects. This study thus employed the 'Heckit' selection bias model[60] to detect the TOL announcement effect. In the context of the problem of estimating the TOL equation for IPOs, a probit model is first estimated explaining why an IPO is on the Turnover List or not. Then, a least squares regression is estimated in the second stage relating the stock price response to the IPO underpricing, the aftermarket abnormal returns and a variable called the "Inverse Mills Ratio" or IMR. Firstly, a probit regression is estimated as follows:

$$TOL_i = x_i\delta + \mathcal{E}_i \tag{4.7}$$

where the dependent variable TOL takes value 1 if TOL is observed and 0 otherwise and x_i is the vector of explanatory variables that is the same as that used in the previous logit model (4). Then, this study calculated the Mill's ratio (IMR) as follows:

$$\tilde{\lambda}_i = \frac{\phi(\tilde{\delta}_1 + \tilde{\delta}_2 x_i)}{\Phi(\tilde{\delta}_1 + \tilde{\delta}_2 x_i)} \tag{4.8}$$

where, $\phi(.)$ denotes the standard normal probability density function, and $\Phi(.)$ denotes the cumulative distribution function for a standard normal random variable. The parameters δ_1 and δ_2 can be estimated by using the probit model (7), based on the observed binary outcome TOL_i. Finally, the author inserted the IMR into the regression equation as an extra explanatory variable, yielding the estimating equation:

[59] The sample consists of N observations; however, the variable of interest is observed only for $n < N$ of these. The selection equation is shown in terms of a latent variable z_i^* that depends on one or more independent variables w_i and is given by $z_i^* = \delta_1 + \delta_2 w_i + u_i \quad i = 1, \ldots, N$. For simplicity I will include only one explanatory variable in the equation. The latent variable is not observed, but the author does observe the binary variable. $z_i = 1$; $z_i^* > 0$ or 0; otherwise. The second equation is the linear model of interest. It is $y_i = \beta_1 + \beta_2 x_i + e_i \;\; i = 1, \ldots, n$. A selection problem arises when y_i is observed only when $z_i = 1$, and if the errors of the two equations are correlated. As a result, the least squares estimators of β_1 and β_2 are biased and inconsistent.

[60] James Heckman is well-known as the Noble Prize-winning econometrician and also develops a solution to the selection bias problem namely 'Heckit'. This simple procedure uses two estimation steps: from the first stage, I create a variable "Inverse Mills Ratio" or IMR by probit estimation and in the second stage I use least squares regression to find the relationship between dependent and explanatory variables including an IMR variable.

$$REACT_i = \xi_1 + \xi_2 x_i + \xi_\lambda \tilde{\lambda}_i + \nu_i \quad i = 1, \dots, n \tag{4.9}$$

where, *REACT*, over the event days -1 through +4, where day 0 is the TOL announcement date. *REACT* equals to $[(P_{i,4}-P_{i,-1})/P_{i,4}] - [(I_{i,4}-I_{i,-1})/I_{i,4}]$, where day 0 is the TOL announcement date, $P_{i,4}$ is the fourth day closing price of the stock and $I_{i,4}$ is the fourth day closing price of the corresponding market index after the TOL announcement. $P_{i,-1}$ and $I_{i,-1}$ are the stock price and index price 1 day before the TOL announcement, respectively. x_i is a column vector of explanatory variables which are the same in the equations (4) and (5). $\tilde{\lambda}_i$ and ν_i are IMR and error term respectively.

4.4.3 IPOs vs Non-IPOs for being Turnover List stocks

According to asymmetric information theories, this study conjectures that an IPO company is more likely to be a TOL stock within a year of going public rather than non-IPO companies, thus the author extended the sample from the IPO cross-sectional data to a panel dataset consisting of 429 Thai companies, excluding financial companies, real estate investment trusts and closed-end investment funds, for the period from 2004 to 2014. The panel data used fixed effects (FE) and random effects (RE) logistic methods[61] were therefore employed in this study. Moreover, the researcher examined whether a firm's characteristics would influence the probability of its stock being speculated. This study considered existing common stocks that are now trading on the Thai stock market. Instead of logit models, this study now worked with a panel logistic regression model. The model is as follows:

$$ln\left(\frac{P_{it}^{TOL}}{1-P_{it}^{TOL}}\right) = \mu_t + \beta X_{it} + \gamma Z_i + \alpha_i, t = 1,2,3, \dots, T \tag{4.10}$$

where P_{it} is the probability that the Turnover List (TOL) variable is equal to 1. X_{it} is a vector of the time-varying predictors, Z_i is a vector of the time-invariant predictors, and α_i represents the combined effects of all the unobserved variables that are constant over time. The author should treat α_i as a set of fixed constants, one for each individual. However, this is equivalent to assuming that α_i is random with unrestricted associations

[61] The crucial difference is that a fixed effects model treats unobserved differences between individuals as a set of fixed parameters that can either be directly estimated out of the estimating equations but unobserved differences are treated as random variables with a specified probability distribution in a random effects model (Allison, 2009).

between α_i and X_{it}. A column vector of explanatory variables is made up of the following: *lnMV* is the natural logarithm of market capitalization calculated by the market share price times the number of shares outstanding; *LIQ* is the liquidity ratio (current assets/current liabilities); *PE* is the Price-Earnings ratio (market price per share/ earnings per share); *LEV* is the financial leverage ratio (debt/equity); *EPS* is the earnings per share; *GROWTH* is sales growth (percentage change between year *t* and year *t*-1); *BHAR* is the 1-year buy-and-hold abnormal return of company *i* from Jan to Dec in each fiscal year[62]; *VOL* is the yearly standardized trading volume[63]; *DIV* is a dummy variable, which is 1 if the firm distributes dividends and 0 otherwise; *IPO* is a dummy variable, which is 1 if the firm issues the IPO at year *t* and 0 otherwise.

4.5 Data and Summary Statistics

4.5.1 Data Construction

The present study obtained data on IPOs and Turnover List (TOL) for the Thai markets from the Stock Exchange of Thailand (SET) and Securities and Exchange Commission (SEC), Thailand database. This study obtained the official prospectus filing form (Form 69-1) from the IPO filing database at the SEC (Thailand) and hand-collected data at the time of IPO, including the number of IPOs issued, the IPO size, the age of the listed company, and the proportion of IPOs owned by the government. For the subscription rates, the author obtained data from the computer database at the SEC library (Bangkok, Thailand). The IPO sample totals 187 IPOs, covering the period 2004 to 2012 and the TOL within one year of the IPO date. This period was selected because the Turnover List regulations were first established in 2004. The author only includes the first TOL for the firms in the IPO sample. The stock prices, the SET and the MAI indices were obtained

[62] Buy and hold abnormal return is calculated as below.

$$BHAR_{i,t} = \prod_{t=1}^{T}(1+R_{i,t}) - \prod_{t=1}^{T}(1+R_{m,t})$$

where, The market-adjusted abnormal returns of company *i* in event month *t* ($AR_{i,t}$) are calculated for each event month *t* as follows: $AR_{i,t} = R_{i,t} - R_{m,t.}$ Thus, $R_{i,t} = (P_{i,t}\text{-}P_{i,t\text{-}1})/P_{i,t\text{-}1}$ where $P_{i,t}$ is the last traded price of the company in event month *t* and $P_{i,t\text{-}1}$ is the last traded price of the company in event month *t*-1. $R_{m,t}$ is the return on the market index (SET or MAI indices) in event month *t* and is calculated as $R_{m,t} = (P_{m,t}\text{-}P_{m,t\text{-}1})/ P_{m,t\text{-}1}$ where $P_{m,t}$ is the last closed stock market index in event month *t* and $P_{m,t\text{-}1}$ is the last closed market index in event month *t*-1. In cases of IPO companies, the author calculated the buy-and-hold abnormal returns (BHAR) from the closing price on the first trading day to the end of the fiscal year.

[63] The researcher followed the study of You *et al*. (2012) to calculate the standardized monthly trading volume as: $VOL_{it} = \frac{V_{it}-\hat{V}_{it}}{Std(V_i)}$ where, for each stock *i*, V_{it} is the trading volume at time *t*, $\hat{V}_i$ is the mean trading volume, and $Std(V_i)$ is the standard deviation of trading volume. The average standardized trading volume for the fiscal year is calculated as $\left[\frac{\sum_{i=1}^{12} VOL_{it}}{12}\right]$.

from the Thomson Reuter database. Table 4.2 shows details of the sample by year and exchange of listing. Approximately 60% (40%) of IPO listings are on the SET (MAI). Most of the firms in the sample issued their IPOs in 2004 (49 IPOs (26.2%)) and 2005 (45 IPOs (24.1%)). Interestingly, the IPO firms for the entire sample mostly came from the service and property & construction sectors. Similarly, the majority of IPOs in the MAI sample were in the property & construction industry (29.8%). For SET IPOs, this study finds that 27.5% of the sample is dominated by the service sector, 16.8% by the industry and property & construction sectors, 11.5% by the financial sector, and 10.6% by the technology sector. For MAI IPOs, these findings show that 16.2% is dominated by the industrial sector, 13.5% by the services and technology sectors, and 10.8% by the resources industry. A possible reason that could explain the number of 'Property & Construction' IPOs in the sample is that after the Asian financial crisis a major government reform was implemented (between 1997 and 1999) in Thailand. The Thai government intended to stimulate economic growth and employment, and so it launched a number of large-scale infrastructure projects, including the sky train (BTS) and the underground train (MRT). Therefore, the construction companies could benefit and earn substantial profits. As a result, several fledgling construction companies went public at this time.

Table 4.2 Sample size of Thai IPOs

Panel A: sample size disaggregated by exchange and by IPO offering year

Year	Stock Exchange of Thailand (SET)		Market for Alternative Investment (MAI)		Total	
	Number	%	Number	%	Number	%
2004	37	32.7	12	16.2	49	26.2
2005	31	27.4	14	18.9	45	24.1
2006	10	8.9	5	6.8	15	8.0
2007	6	5.3	6	8.1	12	6.4
2008	8	7.1	3	4.0	11	5.9
2009	5	4.4	11	14.9	16	8.6
2010	4	3.5	7	9.5	11	5.9
2011	3	2.7	7	9.5	10	5.3
2012	9	8.0	9	12.1	18	9.6
Total	113	100	74	100	187	100

Panel B: sample size disaggregated by exchange and by industry group

Industry	Stock Exchange of Thailand (SET)		Market for Alternative Investment (MAI)		Total	
	Number	%	Number	%	Number	%
Agro & Food	6	5.3	2	2.7	8	4.3
Consumer Products	7	6.2	4	5.4	11	5.9
Financial	13	11.5	6	8.1	19	10.1
Industrial	19	16.8	12	16.2	31	16.6
Resources	6	5.3	8	10.8	14	7.5
Services	31	27.5	10	13.5	41	21.9
Technology	12	10.6	10	13.5	22	11.8
Property & Construction	19	16.8	22	29.8	41	21.9
Total	113	100	74	100	187	100

4.5.2 Summary statistics

Table 4.3 presents the proportions of Turnover List and non-Turnover List for the sample of IPO firms that the author uses for this empirical study. It can be seen that 64 IPOs (34.2%) from the entire sample were on the Turnover List (TOL) within one year following their IPOs. When this study considers the proportion of TOL:Non-TOL by listed exchange separately, it shows a higher proportion on the TOL of stocks in the SET IPOs (46.9%). However, there are 11 IPOs (14.9%) that were TOL stocks for the MAI sample. This implies that Thai speculative stocks are likely to come from large-sized companies. Interestingly, a high density of TOL occurred between 2011 and 2012 because of a bull-market period and high trading volume. In addition to this, it can be seen in Table 4.3 that, Panel B shows that the TOL stocks were mostly from the service sector. There are no TOL stocks from the Agro & Food and financial sectors for the MAI sample.

Table 4.3 The proportion of Turnover List stock (TOL) and Non-Turnover List stock (Non-TOL) for Thai IPOs issued during the 2004-2012 period

Panel A: sample size disaggregated by exchange and by IPO offering year

Year	The entire sample				The Stock Exchange of Thailand (SET)				Market for Alternative Investment (MAI)			
	TOL	%	Non TOL	%	TOL	%	Non TOL	%	TOL	%	Non TOL	%
2004	15	30.6	34	69.4	14	37.8	23	62.2	1	8.3	11	91.7
2005	15	33.3	30	66.7	15	48.4	16	51.6	0	0.0	14	100
2006	5	33.3	10	66.7	5	50.0	5	50.0	0	0.0	5	100
2007	3	25.0	9	75.0	2	33.3	4	66.7	1	16.7	5	83.3
2008	1	9.1	10	90.9	1	12.5	7	87.5	0	0.0	3	100
2009	2	12.5	14	87.5	1	20.0	4	80.0	1	9.1	10	90.9
2010	4	36.4	7	63.6	3	75.0	1	25.0	1	14.3	6	85.7
2011	4	40.0	6	60.0	3	100	0	0.0	1	14.3	6	85.7
2012	15	83.3	3	16.7	9	100	0	0.0	6	66.7	3	33.3
Total	64	34.2	123	65.8	53	46.9	60	53.1	11	14.9	63	85.1

Panel B: sample size disaggregated by exchange and by industry group

Industry	The entire sample				The Stock Exchange of Thailand (SET)				Market for Alternative Investment (MAI)			
	TOL	%	Non TOL	%	TOL	%	Non TOL	%	TOL	%	Non TOL	%
Agro & Food	3	37.5	5	62.5	3	50.0	3	50.0	0	0.0	2	100
Consumer Products	4	36.4	7	63.6	3	42.9	4	57.1	1	25.0	3	75.0
Financial	6	31.6	13	68.4	6	46.2	7	53.8	0	0.0	6	100
Industrial	7	22.6	24	77.4	6	31.6	13	68.4	1	9.3	11	91.7
Resources	3	21.4	11	78.6	2	33.3	4	66.7	1	12.5	7	87.5
Service	22	53.7	19	46.3	19	61.3	12	38.7	3	30.0	7	70.0
Technology	6	27.3	16	72.7	5	41.7	7	58.3	1	10.0	9	90.0
Property & Construction	13	31.7	28	68.3	9	47.4	10	52.6	4	18.2	18	81.8
Total	64	34.2	123	65.8	53	46.9	60	53.1	11	14.9	63	85.1

Table 4.4 shows a comparison of variables, which is taken into consideration when investigating the relationship between the Turnover List and IPO underpricing. The market-adjusted initial returns ($MAIR$) are evident across both stock markets. The average of IPO underpricing for Thai IPOs going to the public between 2004 and 2012 is 22.67%. The researcher also finds that the average market-adjusted initial return in the MAI IPOs (34.46%) was larger than those associated with the SET IPOs (14.95%) and showed a statistically significant difference at 0.01 level. The averages of six-month $BHARs$ in the entire SET and MAI samples are 2.31%, 2.18% and 2.50% respectively. However, there is no significance in the difference in mean of *BHAR* between the SET and MAI samples. The issue size ($SIZE$) is measured by the number of shares offered at the IPO times the IPO offer price. The mean of $SIZE$ for the Thai IPOs is about 1,152 million Baht. It worth noting that the average issue size in the SET is significantly larger than that in the MAI. For AGE_i which is the age of a firm in years from the establishment date to the date of the IPO, the author found that the results associated with SET and MAI have the same pattern; there is also an insignificant difference for AGE between SET- and MAI-market firms. The subscription details for IPOs for foreign PFS and institutional INS investors are also reported in Table 4.4. The average foreign and institutional investors' subscriptions for SET IPOs are 10.9% and 21.21%, but only 4.6% and 8.47% in the MAI market respectively.

To examine the excess return around the date when the firm was announced on the TOL, the author estimated the excess return and obtained 5-day (-1, 4) abnormal returns using standard event study methodology. The author used the SET and MAI equal-weighted index returns as the market index in the event study. The average IPO react prices for the TOL announcement in the entire and in the SET samples show positive returns of 2.72% and 4.4% respectively, but -4.6% in the MAI. Notably, there is a statistically significant difference in the mean of 5-day abnormal returns between the SET and the MAI IPOs. In addition, this study employs a non-parametric test, namely, the two-sample Wilcoxon rank-sum (Mann-Whitney) to test median differences. As can be seen in Table 4.4, the median difference findings are consistent with the mean different *t*-test, suggesting significant differences for $MAIR, SIZE, GOV, PFS, INS$ and $REACT$ between SET- and MAI-market companies.

4.6 The Empirical Results

4.6.1 Relationship between IPO underpricing and Probability of Turnover List Risk

Table 4.5 shows the results of the logit regression estimations.[64] This study first considers the relationship between IPO underpricing and the probability of these being speculative stocks. For the entire sample, the results can be seen in Models (1) to (4). On average, there is a positive and significant relationship between the *MAIR* and the probability of being on the TOL. The marginal effects are reported in brackets below the standard errors (SE) where they indicate that the effect is economically important. The slope coefficient on the variable *MAIR* is 1.434. The marginal effect indicates that a 1% increase in underpricing will lead to the increased likelihood of IPOs being speculative stocks by 41.7%. Contrary to his expectation, the author finds a positive and significant coefficient for the initial returns, contrary to the expectation. In contrary to the IPO signaling expectation and to the IPO signalling model, this study finds a positive and significant coefficient for the initial returns (e.g., Jegadeesh *et al*., 1993; Su and Fleisher, 1999; Kennedy *et al*., 2006). A possible explanation for this finding is that for the first trading day of IPOs, there was no ceiling price in the past in the Thai stock market. However, in 2012 the SET adjusted the ceiling price to 300% from the offering price. This implies that if stock price-fixers would like to pump up the stock price, it is a good opportunity to do this on the first trading day. As a consequence, the magnitude of underpricing has a positive effect on the Turnover List risk.

[64] For the sake of brevity, the author does not report the estimates of the coefficients of year and industry dummy variables.

Table 4.4 Descriptive Statistics of the SET and the MAI IPOs

The descriptive statistics are for the187 Thai IPOs issued during 2004-2012. The SET sample refers to IPOs from the Stock Exchange of Thailand. The MAI sample denotes IPOs from the Market for Alternative Investment. *MAIR* is the market-adjusted initial return (*MAIR*) or the IPO underpricing calculated by $[(P_{i,1}\text{-}P_{i,0})/P_{i,0}] - R_{i,m}$ or percentage change between offer price and IPO closing price on the first trading day. $P_{i,1}$ is the closing price on the first day of trading, $P_{i,0}$ is the IPO offering price, and $R_{i,m}$ is the stock market index return from the IPO date to the first trading date. *BHAR* represents 100-day post abnormal returns for the IPOs calculated as $BHAR_{i,t} = \prod_{i=1}^{T}(1 + R_{i,t}) - \prod_{i=1}^{T}(1 + R_{m,t})$. *SIZE* is the number of shares offered at the IPO times the IPO offer price, and *AGE* is the age of a firm in years from the establishment date to the date of the IPO. GOV_i which is the proportion owned by the government is considered in the model as an explanatory variable. The percentage of foreign and institution investors subscribing for the IPOs are *PFS* and *INS* respectively. *TIMETOL* is the number of days between an IPO and its first Turnover List (TOL). *REACT* is the abnormal TOL 5-day announcement price reaction (over the event days -1 through +4) calculated by $[(P_{i,4}\text{-}P_{i,-1})/P_{i,4}] - [(I_{i,4}\text{-}I_{i,-1})/I_{i,4}]$, where day 0 is the TOL announcement date, $P_{i,4}$ is the fourth day closing price of the stock and $I_{i,4}$ is the fourth day closing price of the corresponding market index after the TOL announcement. $P_{i,-1}$ and $I_{i,-1}$ are the stock price and the index price 1 day before the TOL announcement, respectively. The significance of the difference in the mean (median) of variables between SET and MAI sample measures is computed using the independent-sample *t*-test (the non-parametric test namely two-sample Wilcoxon rank-sum (Mann-Whitney) test).

Variables	**The entire IPOs**				**The SET IPOs**				**The MAI IPOs**				**Different**	
	N	**Mean**	**Median**	**SD**	***N***	**Mean**	**Median**	**SD**	***N***	**Mean**	**Median**	**SD**	***t*-stats**	***z*-stats**
MAIR (%)	187	22.67	17.06	43.39	113	14.95	4.15	36.02	74	34.46	13.92	50.74	-2.868***	-2.476**
BHAR (%)	187	2.31	-5.18	38.07	113	2.18	-5.10	40.64	74	2.50	-4.17	34.04	-0.057	-0.483
SIZE (million Baht)	187	1,152.41	251.25	3,642.36	113	1,798.07	471.25	4,574.33	74	166.44	100.85	262.61	3.782***	8.892***
AGE (year)	187	15.79	13.00	12.24	113	15.91	13.00	13.97	74	15.59	14.50	9.08	0.173	0.879
GOV (%)	187	2.00	0.00	10.9	113	3.00	2.15	13.9	74	0.00	0.00	0.40	2.016**	2.753***
PFS (%)	187	8.41	2.0	13.71	113	10.90	2.93	14.80	74	4.60	1.00	10.89	3.346***	3.332***
INS (%)	187	16.27	0.00	19.52	113	21.21	10.53	21.53	74	8.74	0.56	12.83	4.956***	4.066***
REACT (%)	64	2.72	-2.00	12.08	52	4.40	14.00	12.22	12	-4.6	12.00	8.40	2.433**	2.232**

Note:

*Statistically significant at the 0.10 level.

**Statistically significant at the 0.05 level.

***Statistically significant at the 0.01 level.

These findings are consistent with Li *et al*. (2005)[65], Zheng *et al*. (2005) and Ellul and Pagano (2006), who argue that IPO underpricing fosters higher post-IPO trading volume and turnover in both the short-run and the long-run. The underpricing is likely to lead to IPO oversubscription which in turn increases aftermarket liquidity. This finding also confirms Beatty and Ritter's (1986) theory that more underpricing is a sign of high *ex-ante* uncertainty that may result in a higher TOL risk.

For the after-market return variable *BHAR*, it is positively related to the likelihood of TOL and is statistically significant. The slope coefficient on the aftermarket return variable *BHAR* is 0.793. These point estimates suggest a stronger relation between the IPO underpricing appreciation and the probability of being on the Turnover List than between the after-market abnormal return and the latter. This indicates that the after-market returns of IPOs are a good predictor for the detection of speculative stocks (Turnover List) as well as the IPO underpricing. In addition, the positive coefficient of *BHAR* suggests that the higher the abnormal after-market return, the more likely the listed firms are to be speculative stocks. It was found that the offering size has a positive effect on TOL risk. This is consistent with the finding in Section 3.2 that TOL stocks come from the main stock market. This is in contrast with the UK stock market and other markets where speculative stocks are likely to be traded in the mid-cap FTSE 250, AIM and small-cap stock markets.

This study also included a proportion of IPOs owned by the government (*GOV*) in the logit Models (3) and (4). For these a slightly different regression result was found. Interestingly, the author found that the *GOV* variable was negatively related to the probability of TOL participation. The government mostly invests in high-quality companies or holds only blue-chip stocks[66]. Under Rock's assumption (1986)[67], we can also assume that the Thai government (an informed investor) has better information than uninformed investors because they can perceive which companies will generate huge

[65] Li *et al.* (2005) studied 1,673 IPOs of common stocks listed on NASDAQ between 1993 and 2000. They found that initial return (underpricing) is positively related to turnover ratio which is the daily trading volume divided by the number of shares offered and measures the speed of transaction.

[66] Blue-chip stocks, for example, are good fundamental stocks or the shares of a company in which there is financial strength, a record of profit growth and a good reputation.

[67] 'The 'winner's curse model' by Rock (1986) is probably well known as an asymmetric information model. The assumption is that informed investors such as underwriters and issuing firms are better informed about the intrinsic value of the stocks on offer than general and individual investors. Informed investors invest only in attractively priced IPOs while uninformed investors invest randomly. He suggested that shares must on average be underpriced in order to attract less informed investors to preempt the new IPO. 'The uninformed compete with the informed, and the issuer must ultimately compensate them for their disadvantage" (Rock, 1986, p. 207).

profits from any proposed mega-projects in the future. This supports the Sun *et al*. (2002) study that apart from political and financial support, the states have other impacts on performance of listed companies such as positive signaling, effective monitoring and providing business connections. Seemingly, the government avoids investment in poor quality companies. The findings suggest that the government plays an interesting role for individual investors making investment decisions and speculative stock avoidance concerning the Thai stock market. However, Table 4.5 shows the logit estimates with unexplained *lnAGE*, *PFS* and *INS* as the explanatory variables in place of the age of firms, and the proportion of foreign and institutional investors subscribing for IPOs.

As a robustness check, on separating the entire sample into SET and MAI groups, the researcher gained significant insights into the determinations of TOL participants following IPOs. Using the same vector of explanatory variables as that used in the previous logit regression for the entire sample, the author obtained a coefficient for *MAIR* of 1.836 for the SET IPOs, while for the firms this study obtained a coefficient of 1.647 (See Models 5 and 9). The marginal effects indicate that a 1% increase in underpricing their IPOs increases the likelihood of their being speculative stocks by 73.18% and 6.19% for SET and MAI IPOs respectively. The author found that a 6-month abnormal return after going public also positively affects the likelihood of TOL participation for the entire sample and for the SET sample and is statistically significant. Nevertheless, for MAI IPOs, there is no evidence of a relationship between the aftermarket abnormal return (*BHAR*) and the probability of their being speculative stocks. Again, as is apparent from the coefficients and marginal effects, the strong positive relationship between the likelihood of TOL participation and the level of 6-month abnormal return shown by the IPOs from the SET sample does not exist for the group of MAI IPOs. In addition to this, the researcher found from the logit estimates that *lnAGE*, *PFS* and *INS* still have insignificant effects on the likelihood of being listed on TOL or being speculative stocks.

In addition, this study examines the market reaction to the firms being announced on TOL. To be more specific, this study replaces the TOL dependent variable with 5-day (-1, 4) abnormal return of firms being announced on TOL (*REACT*) and uses the same set of independent variables as the previous regressions with an additional Mill's ratio (IMR). The estimation results are reported in Table 4.6. In all cases, the slope coefficients for *MAIR* and *BHAR* are insignificant. These results are somewhat surprising, given the earlier findings. One possible explanation for the insignificant relationship between IPO

underpricing and the aftermarket return and the abnormal return on the TOL announcement dates is that the market expectations do not reflect the statistical relation between the initial and aftermarket returns of IPOs and Turnover List participation that the author documented. More interestingly, the author found that the estimate of the slope coefficient on the variable *PFS* is reliably negative. This indicates that the stock market reacts more unfavourably to speculative stock announcements by firms with a large proportion of foreign investors holding their IPOs, which in turn implies that the Thai stock market attaches a higher probability to such announcements by these companies. In addition to this, the Mill's ratio is not statistically significant. This implies that this study has no selection bias problem. To verify this finding, the author also used bootstrapped linear regression and bootstrapped quantile regression. These results support the OLS regression that proportion of IPOs subscribed by foreigners is a crucial factor affecting the stock price reaction in the period of the TOL announcement.

A possible reason supporting foreign investor reaction to a Turnover List announcement is the home-biased literature that assumes that investors do not hold a world market portfolio. Foreign investors who invest outside their home country can change their positions quickly when they face such obstacles in their investments. Kang and Stulz (1997) suggest that there are two main barriers are political risk[68] differences between domestic and foreign investors and information asymmetries. Markets for TOL stocks show less liquidity due to margin restriction and the controlling of trading volume by the SEC, Thailand, so that foreign investors may find it expensive to sell the stocks to avoid political risk. The possibility of unexpected surges in Turnover List risk would prompt foreign investors to sell TOL stocks and invest more in securities that have a liquid market. However, the author finds that the remaining variables, including the offering size, age of firm, proportion of IPOs owned the government and subscribed by institution investors, do not in fact affect the price reaction. These variables are included to control for possible differences in the extent to which the market microstructure is surprised by the TOL announcements that are unrelated to the stock returns around the time of their IPOs.

[68] Political risk differences arise if non-resident investors feel that they might have trouble repatriating their holdings or that their holdings might be expropriated altogether, so that their expected return on foreign shares is lower than the expected return for resident.

Table 4.5 Logit regression estimates of the probability of TOL

The logit regression estimates of the relation between the initial returns of IPOs and the probability of a Turnover List (TOL) for the SET and MAI IPOs in the 2004-2012 period. The dependent variable is a dummy variable taking the value 1 if a firm is announced in the TOL by the SEC (Thailand) within 1 year after its IPOs, and 0 otherwise. The independent variables are *MAIR*, which is the market-adjusted initial return or the IPO underpricing calculated by $[(P_{i,1}\text{-}P_{i,0})/P_{i,0}] - R_{i,m}$ or the percentage change between the offer price and the IPO closing price on the first trading day. $P_{i,1}$ is the closing price on the first day of trading, $P_{i,0}$ is the IPO offering price, and $R_{i,m}$ is the stock market index return from the IPO date to the first trading date. *BHAR* represents 3-month post abnormal returns for the IPOs calculated as $BHAR_{i,t} = \prod_{i=1}^{T}(1 + R_{i,t}) - \prod_{i=1}^{T}(1 + R_{m,t})$. *lnSIZE* is the natural logarithm of the number of shares offered at the IPO times the IPO offer price, and *lnAGE* is the natural logarithm of the age of a firm in years from the establishment date to the date of the IPO. *GOV* which is the proportion owned by the government is considered in the model as an explanatory variable. The percentage of foreign and institution investors subscribing for the IPOs are *PFS* and *INS* respectively. Standard Errors are reported in parentheses, and marginal effects are reported within brackets. $\hat{P}$ is calculated by $\hat{P} = \frac{1}{1+e^{-(\propto+\bar{x}'_i\hat{\beta})}}$, where $\bar{x}'$is means of explanatory variables. Thus, the marginal effect is in fact calculated by $\hat{P}(\hat{\beta}_i)$.

Variables	**The Entire IPOs**				**The SET IPOs**				**The MAI IPOs**			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Constant	-0.866***	-0.687***	-16.046***	-16.551***	-0.375*	-0.146	-5.659	-10.192*	-2.546***	-1.743***	-35.951***	-21.857**
	(0.000)	(0.000)	(1.952)	(2.351)	(0.132)	(0.121)	(2.530)	(3.119)	(0.048)	(0.334)	(6.124)	(1.156)
MAIR	0.869**		1.434***	0.947*	1.836**		2.116***	2.106**	1.647***		1.889**	1.674**
	(0.217)		(0.248)	(0.316)	(0.426)		(0.457)	(0.503)	(0.078)		(0.402)	(0.111)
	[0.327]		[0.417]	[0.248]	[0.732]		[0.837]	[0.774]	[0.062]		[0.192]	[0.035]
BHAR		0.856**	0.793*	1.037*		1.412***	1.477**	2.234***		-0.554	-1.238	-2.971
		(0.249)	(0.269)	(0.310)		(0.318)	(0.339)	(0.416)		(0.387)	(0.731)	(0.037)
		[0.274]	0.231	[0.272]		[0.559]	[0.584]	[0.821]		[-0.047]	[-0.126]	[-0.062]
lnSIZE			0.805***	0.855***			0.306	0.559**			1.681**	0.946
			(0.101)	(0.121)			(0.129)	(0.157)			(0.320)	(0.062)
			0.234	[0.224]			[0.121]	[0.206]			[0.171]	[0.020]
lnAGE			-0.280	-0.299			-0.372	-0.215			0.665	-0.077
			(0.138)	(0.153)			(0.163)	(0.185)			(0.360)	(0.060)
			[-0.081]	[-0.078]			[-0.147]	[-0.079]			[0.068]	[-0.002]
GOV			-2.721*	-3.230*			-1.692	-2.658				
			(1.074)	(1.123)			(1.078)	(1.165)				
			[-0.792]	[-0.846]			[-0.669]	[-0.977]				
PFS			0.796	0.340			1.726	0.491			6.929	6.051
			(1.188)	(1.233)			(1.384)	(1.488)			(2.977)	(0.304)
			[0.232]	[0.089]			[0.683]	[0.181]			[0.705]	[0.126]
INS			-0.965	-0.851			0.931	-0.775			-7.558	-2.663
			(0.813)	(0.880)			(0.906)	(0.976)			(3.960)	(0.295)
			[-0.281]	[-0.223]			[0.342]	[-0.285]			[-0.769]	[-0.055]
Year dummy	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Ind. dummy	No	No	No	Yes	No	No	No	Yes	No	No	No	No
$\hat{P}$	0.376	0.319	0.291	0.262	0.399	0.396	0.395	0.368	0.038	0.085	0.102	0.021
n	187	187	187	187	113	113	113	113	74	74	74	74
McFadden R^2	0.025	0.019	0.170	0.267	0.055	0.051	0.140	0.243	0.122	0.005	0.339	0.422

Note:
*Statistically significant at the 0.10 level.
**Statistically significant at the 0.05 level.
***Statistically significant at the 0.01 level.

Table 4.6 OLS estimates including "Inverse Mills Ratio" analysis (Heckman) and bootstrapped linear regression (BSREG) and bootstrapped quantile regression (BSQREG) analyses of the TOL announcement effect

The dependent variable is the abnormal return TOL 6-day announcement price reaction (*REACT*) (over the event days -1 through +4) calculated by $[(P_{i,4}\text{-}P_{i,-1})/P_{i,4}] - [(I_{i,4}\text{-}I_{i,-1})/I_{i,4}]$, where day 0 is the TOL announcement date, $P_{i,4}$ is the fourth day closing price of the stock and $I_{i,4}$ is the fourth day closing price of the corresponding market index after the TOL announcement. $P_{i,-1}$ and $I_{i,-1}$ are the stock price and index price 1 day before the TOL announcement, respectively. The independent variables are *MAIR*, which is the market-adjusted initial return or the IPO underpricing calculated by $[(P_{i,1}\text{-}P_{i,0})/P_{i,0}] - R_{i,m}$ or percentage change between the offer price and the IPO closing price on the first trading day. $P_{i,1}$ is the closing price on the first day of trading, $P_{i,0}$ is the IPO offering price, and $R_{i,m}$ is the stock market index return from the IPO date to the first trading date. *BHAR* represents 3-month post abnormal returns for the IPOs calculated as $BHAR_{i,t} = \prod_{i=1}^{T}(1 + R_{i,t}) - \prod_{i=1}^{T}(1 + R_{m,t})$. *lnSIZE* is the natural logarithm of the number of shares offered at the IPO times the IPO offer price, and *lnAGE* is the natural logarithm of the age of a firm in years from the establishment date to the date of the IPO. *GOV*, which is the proportion owned by the government is considered in the model as an explanatory variable. The percentage of foreign and institution investors subscribing for the IPOs are *PFS* and *INS* respectively. Standard Errors are reported in parentheses.

Variables	Heckman		BSREG	BSQREG
	(13)	(14)	(15)	(16)
Constant	-0.756*	-1.137	-0.756	-0.689
	(0.446)	(0.752)	(0.761)	(0.957)
MAIR	-0.045	-0.028	-0.045	-0.062
	(0.061)	(0.068)	(0.080)	(0.108)
BHAR	0.013	0.032	0.013	-0.015
	(0.038)	(0.055)	(0.059)	(0.078)
lnSIZE	0.044*	0.061	0.044	0.395
	(0.022)	(0.034)	(0.034)	(0.043)
lnAGE	-0.018	-0.023	-0.018	-0.244
	(0.023)	(0.024)	(0.032)	(0.035)
GOV	0.079	0.018	0.080	0.162
	(0.396)	(0.130)	(8.997)	(8.128)
PFS	-0.469**	-0.448**	-0.470*	-0.588*
	(0.093)	(0.192)	(0.239)	(0.321)
INS	0.131	0.103	0.132	0.166
	(0.179)	(0.147)	(0.178)	(0.244)
Inverse Mills Ratio		0.061	-0.040	0.019
		(0.106)	(0.137)	(0.165)
Year dummy	Yes	Yes	Yes	Yes
Ind. Dummy	Yes	Yes	Yes	Yes
n	64	64	64	64
Adj. R^2	0.145	0.116	0.145	
Pseudo R^2				0.326

Note:
*Statistically significant at the 0.10 level.
**Statistically significant at the 0.05 level.
***Statistically significant at the 0.01 level.

4.6.2 Do IPOs appreciate being speculated? (IPO VS non-IPO)

So far, the author has only considered the probability of an IPO firm being classified as speculative stock on TOL. However, the proportion of IPOs appearing on the TOL is only about 17%. Yet most of the earlier speculative manias were focused on the IPOs. (Hong *et al*., 2006). In this section, the author extends the sample to account for both IPOs and existing Thai common stocks.

Table 4.7 reports the results from applying panel logit regression methods to the Turnover List. However, the author uses both a fixed effects (FE) model with robust standard errors and include year dummies to control for changes in unobservable annual shocks that model with robust standard errors and include year dummies to control for changes in

observable annual shocks that may affect the probability of appearing on the TOL[69]. This study employs a Hausman-test to determine whether RE coefficients are identical to the FE coefficients, and suggests that an FE model is more superior for the dataset. It should be noted that no constant is reported for a conditional maximum likelihood method because the constant is conditioned out of the likelihood function.

As can be seen in Models (17) and (19), the abnormal return and the standardized trading volume are significantly associated with an increased risk of being put on the Turnover List. To consider the coefficient of 0.096 for $BHAR$, by exponentiating, the author gets an odds ratio of 1.10. This means that each additional percent of the cumulative abnormal return is associated with a 10% increase in odds for being put on the Turnover List. This is in line with the expectation and also supports the findings of the IPO sample in Section 6.1 that the return is positively related to the likelihood of being speculative stock. Unsurprisingly, the turnover of shares traded is positive and statistically significant. The trading volume is one of the major factors for Turnover List calculation by SEC, Thailand. Therefore, a higher turnover of stocks traded results in a higher probability of there being TOL stocks. Furthermore, the author included an IPO dummy variable in model (18) and found that the coefficient of 1.965 is strongly significant for an *IPO*. This means that when companies go public, their odds of being on the TOL within their IPO years are multiplied by about 5.4. This is in line with the studies of Baker and Wurgler (2006) and Hong *et al*. (2006) that IPOs have some features, such as young companies and a lack of public information, that mean they are more likely to be speculated rather than others. Thus, this study supports the asymmetric information and price manipulation hypothesis that when compared with non-IPOs, IPOs are more likely to become TOL stocks. This implies that price-makers prefer to manipulate the new issues rather than existing stocks due to large asymmetric information and more information-seekers. This is in line with Tinic (1988) and Mok and Hui (1998)'s proposed speculative bubble hypothesis, suggesting that the temporary price divergence of an IPO above its true value in the aftermarket is attributed to the speculation of those investors who could not get an allocation of the oversubscribed new issues and possibly also due to 'price manipulation'.

[69] The author employed a Hausman test to test the null hypothesis that random effect coefficients are identical to the FE coefficients. I reject the null hypothesis, and suggest FE model is more appropriate for our dataset.

Table 4.7 Conditional likelihood of the panel logit regression models and tests of equality for deviation and mean coefficients

The dependent variable is a dummy variable taking the value 1 if a firm is announced in the TOL within each fiscal year, and 0 otherwise. The independent variables are *BHAR*, which is the 1-year buy-and-hold abnormal return of company *i* from Jan to Dec in each fiscal year. *lnMV* is the natural logarithm of market capitalization calculated by the market share price times the number of shares outstanding; *VOL* is the yearly standardized trading volume; *LIQ* is the liquidity ratio (current assets/current liabilities); *PE* is Price-Earnings ratio (market price per share/ earnings per share); *LEV* is financial leverage ratio (debt/equity); *EPS* is earnings per share; *GROWTH* is sales growth (percentage change between year *t* and year *t*-1); and *DIV* is a dummy variable, which is 1 if the firm distributes dividends and 0 otherwise; *IPO* is a dummy variable, which is 1 if the firm issues the IPO at year *t* and 0 otherwise. Standard errors are reported in parentheses, and odd ratios are reported within brackets.

Variable	Conditional likelihood (Fix Effects)			Equality for Deviation and Mean Coefficients
	(17)	(18)	(19)	χ^2 (*p*-value)
BHAR	0.096**	0.080*	0.027	2.32
	(.0461)	(0.039)	(0.036)	(0.127)
	[1.100]	[1.083]	[1.027]	
lnMV	0.052	0.028	0.394**	15.43***
	(0.119)	(0.123)	(0.187)	(0.000)
	[1.053]	[1.029]	[1.483]	
VOL	0.180***	0.163***	0.105**	21.71***
	(0.059)	(0.058)	(0.086)	(0.000)
	[1.197]	[1.177]	[1.111]	
LIQ			0.014	0.83
			(0.038)	(0.364)
			[1.014]	
PE			0.000	0.75
			(0.001)	(0.387)
			[1.000]	
LEV			-0.004	1.31
			(0.001)	(0.253)
			[0.996]	
EPS			0.056	0.43
			(0.071)	(0.512)
			[1.057]	
GROWTH			0.124	1.95
			(0.210)	(0.162)
			[1.132]	
DIV		-0.315**	-0.477**	2.04
		(0.123)	(0.215)	(1.537)
		[0.730]	[0.621]	
IPO		1.695***	1.603***	0.63
		(0.282)	(0.381)	(0.429)
		[5.447]	[4.966]	
Combined test				44.85***
(10 *df*)				(0.000)
i.Year[a]	Yes	Yes	Yes	
IND. Dummy	No	No	No	
n	1,833	1,833	982	
Wald test				
LR test	246.37***	283.11***	152.16***	
Hausman test	209.86***	140.95***	143.16***	

Note:
[a] The YEAR coefficients, which are all comparisons with Year 2004, are not reported in this table.
*Statistically significant at the 0.10 level.
**Statistically significant at the 0.05 level.
***Statistically significant at the 0.01 level.

In contrast, there is no relationship between financial variables and the risk of being on the TOL apart from the *DIV* variable. Exponentiating the coefficient of -0.477 and -0.316 for *DIV* in (18) and (19), the author gets unreasonable ratios of 0.73 and 0.62. This implies that if a listed company changes from distributing a dividend to not distributing a dividend, the odds of its being on the Turnover List are multiplied by 0.73 and 0.62. Hence, the findings support the conclusion of Baker and Wurgler (2006) that the salient "no dividends" mark the stock as speculative.

4.6.3 The frequency of appearing on the TOL and stock market performances

In this section, the author studies the impact of stock market performances on the frequency of a firm appearing on the TOL in each fiscal year instead of binary dummy variable. In consideration of the fact that a dependent variable is a tally of the number of appearances on the TOL in each fiscal year, an additional approach, namely, a Poisson regression model, has been adopted in this study. The researcher extended the count data method to cover multiple periods per individual firm along with fixed effects to control for all time-invariant predictor variables. Thus, the author repeated the sample of 429 firms with yearly counts of TOL appearances in each of the years from 2004 to 2014. The Poisson distribution is perhaps the simplest probability distribution that is appropriate for such count data. Let TOL_{it} be the Turnover List count for firm i in time t. Each of these variables is assumed to have a Poisson distribution with an expected value of λ_{it}. That is, the probability that $TOL_{it} = r$ is given by

$$\Pr(TOL_{it} = r) = \frac{\lambda_{it}^{r} e^{-\lambda_{it}}}{r!}, r = 0, 1, 2, 3, \ldots \quad (4.11)$$

The Poisson distribution is derived from a stochastic process model under the assumption that events cannot occur simultaneously and events are independent[70] (Cameron and Trivedi, 1998). Next, the author let λ_{it} be a log-linear function of the predictor variables as in the following:

$$log\lambda_{it} = \mu_t + \beta X_{it} + \gamma Z_i + \alpha_i \quad (4.12)$$

Where, X_{it} is the vector of explanatory variables and is the same as that used in the previous panel logit model (4.10). Z_i denotes the time-invariant predictors, and α_i denotes the unobserved fixed effects. As before, treating α_i as a set of fixed constants is equivalent to treating them as random variables that have unrestricted correlations with X_{it}. In general, there are two approaches to estimating the equation (4.12), namely, conditional ML and unconditional ML. In the first approach, the likelihood function is conditioned on the sum (over time) and all the counts for each firm, which eliminates the fixed effects (α_i). The resulting conditional likelihood (Cameron and Trivedi, 1998) is proportional to

[70] The independence assumption means that the incidence of an event neither increases nor decreases the probability of future events.

$$\prod_i \prod_t \left(\frac{exp(\mu_t+\beta X_{it})}{\sum_s \exp(\mu_s+\beta X_{is})}\right)^{TOL_{it}} \quad (4.13)$$

The author reports the Poisson regression with FE results in Table 4.8 Model (20)[71]. The results show that all corresponding explanatory variables have a highly significant effect on the TOL count despite market capitalization and liquidity. Examining the parameter estimates and their associated statistics, itcan be seen in Model (20) that the cumulative abnormal return has a significant influence on the Turnover List count, with a coefficient of 0.062. To interpret this, it should be noted how the dependent variable is logged (see Equation 12). This indicates that if a firm is to increase the abnormal return by 1%, the difference in the logs of TOL counts would be expected to increase by a 0.062 unit while holding the other variables in the model as constant. For the $DIV$and IPO, the Poisson regression coefficient comparing dividend (IPO) and non-dividend (non-IPO) firms are estimated, assuming that other variables are constant. The difference in the logs of TOL counts is expected to be 0.858 (0.900) of a unit lower (higher) for dividend (IPO) firms compared to non-dividend (non-IPO) firms, while holding the other variables constant in the model. This is in line with the expectation that an IPO is more frequently on the Turnover List than a non-IPO.

4.6.4 Further Robustness Tests

In addition to the FE and RE panel logistic models, for robustness results we also considered a new alternative test, the 'Hybrid method' proposed by Allison (2009), which may have somewhat better properties than the Hausman test. We combined the FE and RE methods into a single model[72]. We could then easily test the assumption within the hybrid model by directly testing for equality across the pairs of coefficients. The results are show in the last column in Table 4.7. In this case, the crucial test is the joint test revealing that all ten deviation coefficients are equal to the corresponding mean coefficients, thus indicating a need to reject this assumption and supporting the results of

[71] The author revisits dichotomous outcomes in the beginning of section 4.6.1. Therefore, counts of Turnover List in each fiscal year are undertaken in this study as dependent variables. Many authors treat count variables as continuous measures and use OLS regression for their analysis. This may be inappropriate for several reasons. Count variables are necessarily discrete and cannot be negative value. Also, their distributions are highly skewed. A superior approach is a Poisson regression to estimate count data models. However, the estimation problems that plague logistic models turn out to be less serious for count data models.

[72] I detail a construction of the hybrid model and a further analysis in Appendix 4A (Page 159).

the Hausman-test as well as suggesting that a fixed effects approach is superior to a random effects one.

Table 4.8 Poisson regression estimates for Turnover List count data, eleven time periods and unconditional and conditional estimates of a fixed effects negative binomial model

The dependent variable is a Turnover List count for firm *i* in each fiscal year *t*. The independent variables are *BHAR*, which is the 1-year cumulative average abnormal return of company *i* from Jan to Dec in each fiscal year; *lnMV* is the natural logarithm of market capitalization calculated by the market share price times the number of shares outstanding; *VOL* is the yearly standardized trading volume; *LIQ* is the liquidity ratio (current assets/current liabilities); PE is the Price-Earnings ratio (market price per share/ earnings per share); *LEV* is the financial leverage ratio (debt/equity); *EPS* is earnings per share; *GROWTH* is sales growth (percentage change between year *t* and year *t*-1); and *DIV* is a dummy variable, which is 1 if the firm distributes dividends and 0 otherwise; *IPO* is a dummy variable, which is 1 if the firm issues its IPO at year *t* and 0 otherwise.

Variable	**Poisson Regression Model**		**Negative Binomial Model**			
	Fixed Effects (20)		**Conditional Estimates of Fixed Effects (21)**		**Unconditional Estimates of Fixed Effects (22)**	
	Coefficient	Bootstrapped S.E.	Coefficient	Conventional S.E.	Coefficient	Conventional S.E.
Constant			-3.783***	0.896	-3.98***	0.719
CAR	0.062*	0.034	0.028**	0.018	0.113	0.047
lnMV	-0.022	0.140	0.075	0.083	0.009	0.069
VOL	0.082***	0.084	0.188***	0.052	0.286***	0.043
LIQ	-0.010	0.079	0.002**	0.032	-0.035	0.017
PE	0.001	0.001	0.001	0.000	0.001	0.001
LEV	-0.012	0.007	0.000	0.004	-0.001	0.001
EPS	0.165	0.144	0.065**	0.056	0.114	0.05
GROWTH	0.524***	0.169	0.251**	0.128	0.253**	0.155
DIV	-0.858***	0.319	-0.481***	0.181	-0.479***	0.162
IPO	0.900***	0.263	1.138***	0.209	1.083***	0.305
i.Year[a]	Yes	Yes	Yes	Yes	Yes	Yes
IND. Dummy	No		Yes		Yes	
n	1,003		1,003		1,257	
Wald Test	289.81***		191.63***			
α					4.406***	
Pseudo R^2					0.077	

Note:
[a] The YEAR coefficients, which are all comparisons with Year 2004, are not reported in this table.
*Statistically significant at the 0.10 level.
**Statistically significant at the 0.05 level.
***Statistically significant at the 0.01 level.

Again, the FE Poisson regression models are quite weak regarding the effects of overdispersion because FE allows for unobserved heterogeneity across individuals by way of the α_i parameters. The heterogeneity is assumed to be time invariant, and there is probably unobserved heterogeneity that is specific to particular points in time, as a result of unobserved overdispersion. In addition to the bootstrapping S.E. method, we can correct for overdispersion by using the FE negative binomial model as a robustness check. The appeal of this negative binomial model is that the estimated regression coefficients may be more efficient (less sampling variability) and the standard errors and test statistics may be more accurate than those produced by such empirical, after-the-fact corrections as the bootstrap. We assume that the TOL counts are drawn from a negative

binomial distribution[73] for each company for each year. There are several ways to construct a negative binomial regression model. The model below, proposed by Cameron and Trivedi (1998), is usually called the NB2 model, in which the probability mass function for y_{it} is given by

$$\Pr(TOL_{it} = r) = \frac{\Gamma(\theta+r)}{\Gamma(\theta)\Gamma(r+1)}\left(\frac{\lambda_{it}}{\lambda_{it}+\theta}\right)^{r}\left(\frac{\theta}{\lambda_{it}+\theta}\right)^{\theta} \quad (4.14)$$

where λ_{it} is the expected value of TOL_{it}, θ is the overdispersion parameter, and $\Gamma(\bullet)$ is the gamma function. As $\theta \to \infty$, this distribution converges to the Poisson distribution. The same as with the Poisson model, the expected value of TOL_{it} is described by a log-linear regression as in Equation (12). The results of conditional and unconditional ML by estimating the negative binomial regression model[74], including the individual firm dummy variables, are reported in the last column of Table 4.9[75]. The author omitted 163 firms that had no TOLs in any of the 11 years. It can be seen that the coefficients for the negative binomial models (25) and (26) are very similar to those for the FE Poisson model (24). Moreover, the S.E. and test statistics for the negative binomial model are close to those for the Poisson model with bootstrapped S.E. The estimated parameter labelled Alpha is a measure of overdispersion. It is basically an estimate of $1/\theta$, where θ is the parameter in Equation (4.14). The alpha (α) value is greater than 0, which indicates that there is a significant amount of overdispersion. As a result, the author should reject the Poisson model with conventional S.E. in favour of the negative binomial model. However, the results from the negative binomial model are the same as those from Poisson regression with bootstrapping S.E.

4.7 Conclusion

This chapter investigated the relationship between IPO underpricing and aftermarket abnormal returns and the subsequent classification of such stocks as speculative investments. The researcher found that 34.2% of the IPO firms in the sample were speculative stocks within one year following their IPOs. The author also found that firms

[73] The negative binomial distribution is a generalization of the Poisson distribution that allows for overdispersion by way of an additional parameter.
[74] Hausman *et al.* (1984) proposed a fixed effects negative binomial regression model and they also derived a conditional ML estimator for the model. However, Allison and Waterman (2002) argued that this is not a true fixed effects regression model and the method does not control for all stable predictors.
[75] Coefficients for the dummy variables for firms are not reported.

from the SET that experienced relatively larger underpricing for their IPOs and higher aftermarket abnormal returns are subsequently more likely to be on the Turnover List, unlike the MAI IPOs. This indicates that the initial returns around the date of the IPO play a significant role in predicting future speculative stocks. Furthermore, this study shows that the proportion of IPOs owned by foreigners is negatively related to the abnormal returns of IPOs around the TOL announcements. This study therefore concludes that IPO underpricing and the aftermarket returns are significant indicators of stocks being placed on the Turnover List. In addition, this study used the panel dataset including IPO and non-IPO firms and found here that the abnormal return and the standardized trading volume increased the risk of appearing on the Turnover List. The abnormal return, the trading volume, and the firm's growth also have significant effects on the Turnover List count. The author also found that IPO and non-dividend companies have a higher risk of being on the Turnover List.

The findings are particularly useful for SET and SEC, enabling the Thai authorities to monitor IPOs that have a high probability of becoming speculative stocks in the future and so be able to warn investors about the risks associated with trading in them. Regulators can also use the probability of Turnover List risk as one of the benchmarks to measure the success of the rules they impose on companies that plan on going public. In addition, understanding the determinants of speculative stocks is crucial for many stakeholders especially money-lenders (e.g., banks and building societies) and investors (individuals and portfolio managers), who are increasingly facing challenges in predicting and managing investment risks.

Appendix 4A

A Hybrid Method

In Section4.6.3, I combined the fixed effects (FE) and the random effects (RE) approaches into a single model. This was accomplished by de-composing each time-varying predictor into a within-company component and a between-company component and then fitting a RE model with both components. The between-company component is the company-specific mean of each variable. The within-company component is the deviation from that company-specific mean. The author can now include time-constant variables in the model, compare FE and RE, and produce a wider class of models.

The results from using a RE model for the Turnover List are shown in Table 4A. All the variable names beginning with *M* (*D*) refer to company-specific means (deviations from those means). The coefficients for the deviation variables are functionally equivalent to FE coefficients because they are estimated using only with-firm variation and then controlling for all stable predictors. The coefficients for the mean variables are not very interesting in themselves, but what is striking is how much larger (in magnitude) they are than the corresponding deviation coefficients.

Table 4A Hybrid model for the Turnover List panel data

Variable	**Coefficient**	**Std.**	***z***	***P*-value**
Constant	-7.2689***	0.9102	-7.9900	0.0000
DCAR	0.0369	0.0400	0.9200	0.3570
DlnSIZE	0.3453**	0.1700	2.0300	0.0420
DLIQ	0.0145	0.0314	0.4600	0.6440
DlnVOL	0.2069**	0.0858	2.4100	0.0160
DPE	0.0007	0.0008	0.8300	0.4060
DLEV	0.0012	0.0018	0.6300	0.5280
DEPS	0.0298	0.0520	0.5700	0.5660
DGROWTH	0.0992	0.1454	0.6800	0.4950
DDIV	-0.4418***	0.1605	-2.7500	0.0060
DIPO	1.7046***	0.3461	4.9300	0.0000
MCAR	0.3386	0.2578	1.3100	0.1890
MlnSIZE	-0.4188***	0.0849	-4.9300	0.0000
MlnVOL	0.7124***	0.0725	9.8200	0.0000
MLIQ	-0.1011**	0.0538	-1.8800	0.0600
MPE	0.0022	0.0021	1.0400	0.2980
MLEV	-0.0077*	0.0042	-1.8400	0.0650
MEPS	0.0664	0.0695	0.9600	0.3400
MGROWTH	-0.0333	0.1671	-0.2000	0.8420
MDIV	-0.1455	0.1821	-0.8000	0.4240
MDIPO	2.8983**	1.2844	2.2600	0.0240
i.YEAR	YES			
n	2,395			
Wald test	225.28***			
LR test	53.44***			

Note:
*Statistically significant at the 0.10 level.
**Statistically significant at the 0.05 level.
***Statistically significant at the 0.01 level.

CHAPTER 5

CONCLUSIONS

Chapter 5

Conclusions

5.1 Introduction to and Outline of Chapter

This chapter presents the empirical findings of the thesis. It discusses the main limitations of the outcomes. This is then concluded with a discussion of potential further research areas that were unexplored in this thesis and of the implications of the findings

5.2 Summary of the Main Findings

This thesis has presented three empirical studies concerning the long-run performance of Thai IPOs, the intended uses-of-IPO-proceeds disclosure influencing IPO performance in the short- and long-run and IPOs' signalling for the detection of speculative stocks. The main results of each are summarized in this section.

5.2.1 Long-Run Performance of Thai IPO Results

In the first empirical chapter (Chapter 2), the author discussed the findings to answer the research questions:

> *'How do Thai IPO companies perform relative to several benchmarks in the long-run?'*
>
> *'Do both event-time and calendar-time approaches produce the same results?'*

The author applied a very broad variety of quantitative methods, ranging from classical event study measures (such as CARs, BHARs or WRs) to multi-factor models, which actually extend far beyond the commonly used Fama-French and Carhart models because the author also included, in particular, the liquidity factor. The Carhart and LCAPM model factors are not publicly available for Thailand, so the author created them for the purpose of this study, as well as for the analysis of the size-decile portfolio

abnormal return (SD). In addition, the author provided quantitative analysis by investigating the cases of individual IPO companies which, for example, were characterised by unusually high returns, through explaining the circumstances related to their business activity etc. (very few papers in this area even attempt to do that and engage in such detailed analysis of this kind) in order to provide better explanation and understanding of the results. The author additionally investigated performance relative not only to the entire market but also to the individual industry benchmarks.

Overall, this study provides evidence that Thai IPO underperformed in the long-run after going public when measured by equally-weighted event-time CARs and BHARs and by calendar-time returns. These findings are mostly consistent with previous studies. In addition, the results show that the stock prices of large firms behaved differently from those of small and medium-sized companies. Large IPOs were characterized by poor long-run returns, whereas the IPOs of smaller companies performed better. However, the findings are different when market value-weighted event time is used. The value-weighted returns of IPO stocks relative to the market over a three-year holding period show an over-performance. Furthermore, when the sample was segmented into separate industry sectors, the results suggest that investors who used a value-weighted portfolio of IPOs to measure the long-term performance obtained positive abnormal returns in the long-run from the IPOs belonging to the Resource and the Property & Construction sectors. Moreover, the IPOs from the Industrial and Technology sectors were characterised by poor performance

The performance of Thai IPOs over a long horizon period varies according to the methodology and the portfolio weighting. The results from the first empirical work suggest that investors who measured their investment in the SET market IPO companies using the event-time approach with value-weighted CAR and BHAR would conclude that they could gain positive returns in the long-run. However, if they considered the equally-weighted CAR and BHAR, the event-time returns related to CAPM, FF and SD models and the calendar-time approach, they would conclude that they cannot earn any abnormal returns irrespective of the alternative benchmarks and weighting methods used. In the same vein, after controlling for the size-effect, the findings show that Thai IPOs perform worse than the benchmarks in the long-run either using event-time approach or calendar-time approach.

5.2.2 The Intended Use-of-IPO-Proceeds Results

As the title of Chapter 3 indicates, the second empirical chapter explores the role of use-of-proceeds information disclosure in understanding IPO underpricing and the long-term performance of IPO companies. Empirical evidence is gathered as the result of a construction of a use-of-proceeds disclosure index and also the author also developed his own classification of use-of-proceeds disclosures, with the aim of determining disclosure relating to the purpose of using IPO proceeds. In the same vein, the author classified the uses of IPO proceeds to be invested in new projects and used to make debt repayments. In the second empirical chapter, the author posed the following two research questions:

> '*Do the levels of use-of-proceeds information disclosures affect IPO underpricing and long-run performance?*'

> '*Which important factors can determine the performance of IPOs*?'

Overall, the results suggest that increasing levels of use-of-proceeds disclosures can reduce *ex-ant*e uncertainty and IPO under-pricing, and the disclosure index has a positive effect on the long-run performance of IPOs. In addition, the author grouped the use-of-proceeds into 2 categories: 'Investment' and 'Debt Repayment' IPOs based on the level of IPO proceeds disclosure and the proceeds purposes. It was found that the size of the issue, the return on equity and the bull-market conditions are significant determinants of under-pricing. However, there is in fact no statistically significant relationship with other explanatory factors such as age, time-lag, return on assets, changes in earnings per shareand the proportion of foreigners and institutions subscribing to IPOs and the level of under-pricing.

The results obtained from the second empirical study also show that the *ex-ante* uncertainty and signalling hypotheses partially explain the IPO under-pricing phenomenon in the Thai IPO market. In addition, several hypotheses were posed and tested concerning IPO under-pricing and the long-run performance of IPOs and these then supported the impresario hypothesis that posits a positive relation between under-pricing and three-year aftermarket abnormal returns. The analysis of the effect of the use of IPO proceeds based on the different types of disclosure on three-year aftermarket abnormal

returns indicates that IPO companies that declared their use-of-proceeds to be for investment performed better in the long-run than 'Debt Repayment' IPOs. Interestingly, government or state ownership in the IPO filing period is positively associated with the long-run performance of IPOs. The important factors which have an effect on the performance of IPOs in the long-run are the use-of-proceeds disclosure, the IPO underpricing and the proportion of IPOs owned by the government.

The second empirical chapter focussed on Thai firms, with their unique characteristics, government ownership and foreign and institutional investor settings. The author also added to the extant knowledge in this area of disclosure, IPO pricing and the performance of IPOs in the long-run by investigating the behaviour of IPOs around a key political event during the sample period in the study (the military coup in Thailand).

5.2.3 IPO Signalling and Turnover List Results

The third empirical chapter (Chapter 4) investigated the relationship between IPO underpricing and abnormal aftermarket returns and the subsequent classification of such stocks as speculative investments. The author tried to answer the following research questions:

> '*Do the nature and extent of the initial returns of IPOs and after-market returns explain the probability of stocks appearing on the Turnover List, and if so, in what way*?'

> '*Are IPOs stocks more speculated than non-IPO stocks?*'

This study showed that 34.2% of the IPO firms in the sample were speculative stocks within one year following their IPOs. It was also found that firms from the SET that experienced relatively larger underpricing for their IPOs and higher aftermarket abnormal returns are subsequently more likely to be on the Turnover List. Unlike with the MAI IPOs, this indicates that the initial returns around the date of the IPO play a significant role in predicting future speculative stocks.

Furthermore, the author found that the proportion of IPOs owned by foreigners is negatively related to abnormal returns of IPOs around the time of the TOL announcements. It was therefore concluded that IPO underpricing and the aftermarket return are significant indicators of stocks being placed on the Turnover List. In addition, a panel dataset including IPO and non-IPO firms was used and it was found here that the abnormal return and the standardized trading volume increased the risk of appearing on the Turnover List. The abnormal return, the trading volume, and the firm's growth also have significant effects on the Turnover List count. Moreover, the author confirmed that IPO companies and non-dividend companies have a higher risk of stock speculation and being on the Turnover List.

Overall, the results support the existing debate on long-run return anomalies, suggesting that the long-run performance of IPOs depends on the methods used to measure returns, and especially on the weighted scheme used. In addition, the information disclosure in the prospectus file plays a significant role in pricing an IPO and in its long-term performance. The results indicate that firms that stated their use-of-IPO-proceeds to be paying off their loans show a poor performance in the long-run. Furthermore, the empirical findings suggest that IPO under-pricing and aftermarket abnormal return are interesting indicators for the detection of speculative (Turnover List) stocks, supporting the application of the IPO signalling model and the market feedback hypothesis and the contention that a firm's characteristics, such as new issuers and non-dividend distribution, increase the risk of their IPOs becoming speculative stocks.

5.2 Implications of the study

This research has several important implications for both investors and regulators. First, from an investor's viewpoint, the existence of price patterns may present opportunities for the implementation of active trading strategies to generate superior returns. Given the conflicting results of poor post-IPO stock market performance, investors may do better holding Thai IPOs for a short period with the likelihood of gaining a higher return. In addition, the results can help investors to identify which characteristics are associated with more over-performance or underperformance, which is informative for them when formulating their investment strategies. For security analysts, the conflicting results afford more opportunities for them to extend their consultation services and expertise to investors by recommending stocks that might over-perform in the long-run. Second, the

finding of non-zero aftermarket performance calls into question the informational efficiency of the IPO market. It suggests that stock markets in general and the IPO market in particular are subject to fads that affect market prices. Finally, the cost of external equity capital for firms going public depends not only upon the transaction costs incurred in the IPO process but also upon the returns that investors receive in the aftermarket. To the degree that low returns are gained in the aftermarket, the cost of external equity capital is lower for these listed firms. Chapter 2 should thus be of interest to scholars working in the areas of corporate and behavioural finance, market based accounting as well market anomalies and efficiency. The results can alert them to the stock performance measures of using various alternative techniques and can provide them with useful guidance to evaluate not only the long-run performance of IPOs but also the long-run impact of a corporate or regulatory event. This study can also assist academics and/or practitioners to evaluate the robustness of the findings from prior studies. Furthermore, the findings from the second empirical study suggest that IPO companies with high levels of use-of-proceeds disclosure for investment purposes reduce *ex-ante* uncertainty in that these disclosures help investors to better estimate the dispersion of the secondary market. These results are likely to be of interest to investors in terms of short-term and long-term investment planning for Thai IPOs. Chapter 4 also provides novel evidence that IPO prospectus information on the intended use of the proceeds predicts IPO post-offering performance. Thus, the prospectus information can help investors avoid firms issuing equity to pay off their loans and thus also having disappointing post-offering returns. The IPO firms may choose a number of signalling mechanisms, in addition to their characteristics. More specifically, information disclosure may be used as another signalling factor but, just as with governance, it creates a trade-off between the benefit of reducing information asymmetry and the costs associated with revealing proprietary information and possible litigation. Finally, the findings from the third or last empirical work in this thesis are particularly useful for SET and SEC, enabling the Thai authorities to monitor IPOs that have a high probability of becoming speculative stocks in the future and so to be able to warn investors about the risks associated with trading in them. Regulators can also use the probability of Turnover List risk as one of the benchmarks to measure the success of the rules they impose on companies that plan on going public. Policy makers and regulators can improve laws for the future as well as avoid the mistakes of the past. Specifically, the laws must aim to protect the minority shareholders and in certifying investment bankers, underwriters and managers of IPO firms by making them more accountable. Professionals (such as corporate financiers, accountants and

lawyers), especially those dealing with IPOs, will be able to draw on the findings of the study to improve their knowledge and professional practices when dealing with issuers. Prospective issuers can become more informed about matters related to avoidance in boosting the offering price and IPO valuations. In addition, understanding the determinants of speculative stocks is crucial for many stakeholders especially money lenders (i.e. banks and building societies) and investors (individuals and portfolio managers), who are increasingly facing challenges in predicting and managing investment risks.

5.3 Limitations of this study

The results and implications of this study should be considered within the context of the following limitations. For the first empirical study, the post-IPO period scrutinised in this study spanned three years and this may be an inadequate length of time for gains or losses to be revealed by the IPO companies. For the intended use-of-IPO-proceeds variables, it is difficult to correctly classify them in each category. According to the prospectus file in Thailand, some firms intend to use the proceeds for several issues at the same time such as general operation purposes, working capital, expanding business and others. Due to the limitation of our finite sample size, we classify the intended use-of-proceeds into two types, merely based on recapitalization and information disclosure. For example, if a firm does not mention its use-of-proceeds to be for repaying debt, it is put into the 'Investment IPOs' group. Finally, using probability model, this study examines the association between IPO underpricing, aftermarket return and firm characteristics and the likelihood of being speculative stocks. The Turnover List (TOL) has been defined as speculative stocks in the Thai stock market since 2004. In the early period of the TOL being effective, the SEC announced TOL stocks from the SET market only. When considering both SET and MAI markets simultaneously, this may lead to over-weight for the volume of TOL in the SET. In addition, on 20th July 2015 the SEC (Thailand) cancelled the TOL regulation and introduced a new implement, namely, the 'Volume Alert' instead of TOL. There are now some regulatory changes involved with speculative stock classification in Thailand.

5.4 Suggestions for Future Research

The examination of the performance of IPOs, IPO under-pricing and the intended use-of-IPO-proceeds, together with IPOs' signalling for speculative stock detection, are fruitful areas for research, not only for IPO event studies but also for financial accounting and corporate finance issues such as firms' information disclosure and speculative stock announcements.

A further extension of the long-run performance of IPOs might be to consider a longer period after going public. In addition it is suggested for future studies that once the IPO sample size is suitably large, various types of use-of-proceeds should be taken into consideration in order to increase the different types of use-of-proceeds disclosures. The findings of the long-run performance of IPOs suggest that researchers interested in event studies should consider analyzing each particular company that produces large abnormal return in the sample period because such companies may affect the portfolio returns, be they from big-size stock or the small-size stock. For the IPO signaling model, seasoned equity offerings (SEOs) should be included in future studies. However, there are no IPO studies examining these issues for SEO companies in Thailand due to the small number issuing SEOs after the IPO period. Finally, this study examined the association between companies or IPO characteristics and the probability of their being speculative stocks. Recently, the SET and SEC (Thailand) have introduced 'Volume Alert' to warn investors which stocks have speculative features. The determinants of Volume Alert participation using the IPO signaling model approach are left for future research.

References

Abhakorn, P. and Tantisantiwong, N., 2012, *A reexamination of capital controls' effectiveness: Recent experience of Thailand*, Journal of Asian Economics, **23**, 26-38.

Adjasi, C., Osei, K. and Fiawoyife, E., 2011, *Explaining underpricing of IPOs in frontier markets: Evidence from the Nigeria Stock Exchange*, Research in International Business Finance, **25**, 255-265.

Agathee U.S., Sannassee R.V. and Brooks C., 2014, *The Long-run performance of IPOs: The case of the Stock Exchange of Mauritius*, Applied Financial Economics, **24**, 1123-1145.

Aggarwal, R., and Rivoli, P., 1990, *Fads in the initial public offering market?* The Journal of the Financial Management Association, **19**, 45–57.

Aggarwal, R.K. and Wu, G., 2006, *Stock market manipulations*, Journal of Business, **79**, 1915-1953.

Ahmad-Zaluki N.A., Campbell K. and Goodacre A., 2007, *The long run share price performance of Malaysian Initial Public Offerings (IPOs)*, Journal of Business Finance and Accounting, **34**, 78-110.

Akhigbe A., Johnston J. and Madura J., 2006, *Long-term industry performance following IPOs*, Quarterly Review of Economics and Finance, **46**, 638-651.

Allen, F. and Faulhaber, G.R. 1989, *Signalling by Underpricing in the IPO Market*, Journal of Financial Economics, **23**, 303-323.

Algebaly, E.M., Ibrahim, Y. and Ahmad-Zaluki, N. 2014, *The determinants of involuntary delisting in the Egyptian IPO equity market*, Review of Accounting and Finance, **13**, 171-190.

Allen D.E., Morkel-Kingsbury N.J. and Piboonthanakiat W., 1999, *The long-run performance of initial public offerings in Thailand*, Applied Financial Economics, **9**, 215-232.

Allison, P.D., 2009, Fixed effects regression models, Quantitative Applications in the Social Sciences, SAGE Publication Inc., USA.

Allison, P.D. and Waterman, R., 2002, Fixed effects negative binomial regression models, In R.M. Stolzenberg (Ed.), Sociological methodology, Oxford, UK

Álvarez, S. and González, V.M., 2005, *Signalling and the Long-run Performance of Spanish Initial Public Offerings (IPOs)*, Journal of Business Finance and Accounting, **32**, 325-350.

Amihud, Y., 2002, *Illiquidity and stock returns: Cross-section and time-series effects*, Journal of Financial Markets, **5**, 31-56.

Andriansyah, A. and Messinis, G., 2016, *Intended use of IPO proceeds and firm performance: A quantile regression approach*, Pacific-Basin Finance Journal, **36**, 14-30.

Arthurs, J.D., Busenitz, L.W., Hoskisson, R.E. and Johnson, R.A., 2009, *Signaling and initial public offerings: The use and impact of the lockup period*, Journal of Business Venturing, **24**, 360-372.

Baker, M. and Wurgler, J., 2006, *Investor sentiment and the cross-section of stock returns*, Journal of Finance, **61**, 1645-1680.

Banz, R.W., 1981, *The relationship between return and market value of common stocks*, Journal of Financial Economics, **9**, 3-15.

Bayley, L., Lee, P.J. and Walter, T.S., 2006, *IPO flipping in Australia: cross-sectional explanations*, Pacific-Basin Financial Journal, **14**, 327-348.

Beakman, J., Garner, J., Marshall, B. and Okamura, H., 2001, *The influence of underwriter reputation, keiretsu affiliation, and financial health on the underpricing of Japanese IPOs*, Pacific-Basin Finance Journal, **9**, 513-534.

Beatty, R.P. and Ritter, J.R., 1986, *Investment banking, reputation, and the underpricing of initial public offerings*, Journal of Financial Economics, **15**, 213-232.

Benston, G.J., 1990, The Separation of Commercial and Investment Banking: The Glass-Steagall Act Revisited and Reconsidered, New York: Oxford University Press.

Bessler, W. and Bittelmeyer, C., 2008, *Patents and the performance of technology firms: evidence from initial public offerings in Germany*. Financial Markets and Portfolios Management, 22, 323-356.

Bommel, J., 2002, *Message from market to management: the case of IPOs*, Journal of Corporate Finance, **8**, 123-138.

Bommel, J. and Varmaelen, T., 2003, *Post-IPO capital expenditures and market feedback*, Journal of Banking and Finance, **27**, 275-305.

Botosan, C.A., 1997, *Disclosure level and the cost of equity capital*, Accounting Review, **72**, 323–349.

Boonchuaymetta, E. and Chuanrommanee, W., 2013, *Management of the IPO performance in Thailand*, Journal of Multinational Financial Management, **23**, 272-284.

Bradley, D.J. and Cooney, J.W., Dolvin, S.D and Jordan, B.D., 2006, *Penny stock IP*Os, Financial Management, **35**, 5-29.

Bradley, D.J., Gonas, J.S., Highfield, M.J. and Roskelley, K.D., 2009, *An examination of IPO secondary market returns*, Journal of Corporate Finance, **15**, 316-330.

Brav, A., Geczy, C. and Gompers, P., 2000, *Is the abnormal return following equity issuance anomalous?*, Journal of Financial Economics, 56, 209-249.

Brav, A. and Gompers, P., 1997, *Myth or reality? The long-run underperformance of initial public offerings: Evidence from venture and nonventure capital-backed companies*, Journal of Finance, **52**, 1791-1821.

Brennan, M.J., Tarun C., and Avanidhar, S., 1998, *Alternative factor specifications, security characteristics, and the cross-section of expected stock returns*, Journal of Financial Economics, **49**, 345-373.

Brounen, D. and Eichholtz, P., 2002, *Initial Public Offerings: Evidence from the British, French and Swedish property share markets*, Journal of Real Estate Finance and Economics, **24**, 103-117.

Brown, S. and Warner, J.B., 1980, *Measuring security price performance*. Journal of Financial Economics, **8**, 205-258.

Brown, S.J. and Warner, J.B., 1985, *Use of daily stock returns: The case of event studies*, Journal of Financial Economics, **14**, 3-31.

Bukh, P., Nielsen, C., Gormsen, P. and Mouritsen, J., 2005, *Disclosure of information on intellectual capital in Danish IPO prospectuses*, Accounting, Auditing and Accountability Journal, **18**, 713-732.

Burrowes, A.and Jones, K., 2004, *Initial public offerings: Evidence from the UK*. Managerial Finance, **30**, 46-62.

Cameron, A.C. and Trivedi, P.K., 1998, Regression analysis of count data, Cambridge, UK: Cambridge University Press.

Carpenter, R.E. and Rondi, L., 2006, *Going public to grow? Evidence from a panel of Italian firms*, Small Business Economics, **27**, 387–407.

Carter R.B., Dark, F.H. and Singh, A.K., 1998, *Underwriter reputation, initial returns, and the long-run performance of IPO stocks*. Journal of Finance, **53**, 285-311.

Chahine, S. and Filatotchev, I., 2008, *The effects of information disclosure and board independence on IPO discount*, Journal of Small Business Management, **46**, 219-241.

Chen, D.-H, Bin, F.-S., Puclik, M.S. and Chen, T.-J., 2011, *The initial and long-run performance of REIT IPOs: Empirical evidence from Taiwan*. Middle Eastern Finance and Economics, **10**, 6-16.

Chen, G., Firth, M. and Kim, J.B., 2000, *The post-issue market performance of initial public offerings in China's new stock markets*, Review of Quantitative Finance and Accounting, **14**, 319-339.

Chen, G., Firth, M. and Kim, J.-B., 2004, *IPO underpricing in China's new stock markets*, Journal of Multinational Financial Management, **14**, 283-302.

Cheung Y., Ouyang Z. and Tan W., 2009, *How regulatory changes affect IPO underpricing in China*. China Economic Review, **20**, 692-702.

Chi, J., McWha, M. and Young, M., 2010, *The performance and the survivorship of New Zealand IPOs*, International Review of Financial Analysis, **19**, 172-180.

Chi, J. and Padgett, C., 2005, *Short-run underpricing and its characteristics in Chinese initial public offering (IPO) markets*, Research in International Business and Finance, **19**, 71-93.

Chiou, J.-S., Wu, P.-S., Chang, A. W. and Huang, B.-Y., 2007, *The asymmetric information and price manipulation in stock market*, Applied Economics, **39**, 883-891.

Cho, J. and Lee, J., 2013, The venture capital certification role in R&D: Evidence from IPO underpricing in Korea, Pacific Basin Finance Journal, **23**, 83-108.

Chorruk, J. and Worthington, A.C., 2010, *New evidence on the pricing and performance of initial public offerings in Thailand, 1997-2008*, Emerging Market Review, **11**, 285-299.

Chowdhry, B. and Sherman, A., 1996, *International differences in oversubscription and underpricing of IPOs*, Journal of Corporate Finance, **2**, 359-381.

Concha, A., Galindo, A.J. and Vasquez, D., 2011, *An assessment of another decade of capital controls in Columbia: 1998-2008*, The Quarterly Review of Economics and Finance, **51**, 319-338.

Corhay, A., Teo, S. and Rad, A.T., 2002, *The long run performance of Malaysian initial public offerings (IPO): Value and growth effects*, Managerial Finance, **28**, 52-65.

Costa, B.A., Crawford, A. and Jakob, K., 2013, *Does culture influence IPO Underpricing?*, Journal of Multinational Financial Management, **23**, 113-123.

Daily, C.M., Certo, T.S., Dalton D.R. and Roengpitya, R., 2003, *IPO underpricing: A meta-analysis and research synthesis*, Entrepreneurship Theory and Practice, **27**, 271-296.

Daimond, D.W. and Verrecchia, R.E., 1991, *Disclosure, liquidity, and the cost of capital*, Journal of Finance, **46**, 1325-1359.

Darmadi, S. and Gunawan, R., 2013, *Underpricing, board structure, and ownership: An empirical examination of Indonesian IPO firms*, Managerial Finance, **39**, 181-200.

Davidson R. and MacKinnon J., 1993, *Estimation and Inference in Econometrics*, Oxford University Press: New York.

Dimovski, W., Philavanh, S. and Brooks, R., 2011, *Underwriter reputation and underpricing: evidence from the Australian IPO market*, Review of Quantitative Finance and Accounting, **37**, 409-426.

Dimson, E. and Marsh, P., 1986, *Event study methodologies and the size effect* The case of UK press recommendations*, Journal of Financial Economics, **17**, 113-142.

Durukan, M.B. (2002). The relationship between IPO returns and factors influencing IPO performance: Case of Istanbul Stock Exchange, *Managerial Finance*, 28 (2), 18-38.

Dooley, M.P., 1996, *A survey of literature on controls over international capital Transactions*, IMF Staff Papers, **43**, 639-687.

Dorn, D., and Huberman, G., 2010, *Preferred Risk Habitat of Individual Investors*, Journal of Financial Economics, **97**, 155–173.

Dye, R.A., 2001, *An evaluation of "essays on disclosure" and the disclosure literature in accounting*, Journal of Accounting and Economics, **32**, 181-235.

Eckbo, B., Maksimovic, V and Williams, J., 1990, *Consistent estimation of cross-sectional models in event studies*, The Review of Financial Studies, **3**, 343-365.

Eckbo, B., Masulis, R. and Norli, Ø., 2000, *Seasoned public offerings: resolution of the 'new issues puzzle'*, Journal of Financial Economics, **56**, 251-291.

Eckbo, B., Masulis, R. and Norli, Ø., 2007, Handbooks in Finance: Empirical Corporate Finance Chapter VI Security Offerings, 4th ed. Elsevier, USA.

Ekkayokkaya, M. and Pengniti, T., 2012, *Governance reform and IPO underpricing*, Journal of Corporate Finance, **2**, 238-253.

Ellul, A. and Pagano, M., 2006, *IPO underpricing and after-market liquidity*, The Review of Financial Studies, **19**, 381-421.

Eng, L.L. and Aw, H.S., 2000, *An Analysis of Factors Affecting Investor Demand for Initial Public Offerings in Singapore*, Multinational Finance Journal, **4**, 133-153.

Espenlaub, S., Gregory, A. and Tonks, I., 2000, *Re-Assessing the long-Term under-performance of UK Initial Public Offerings*, European Financial Management, **6**, 319-342.

Espenlaub, S., Khurshed, A. and Mohamed, A., 2012, *IPO survival in a reputational market*, Journal of Business Finance & Accounting, **39**, 427-463.

Fama, E.F., Fisher, L., Jensen, M.C. and Roll, R., 1969, *The adjustment of stock prices to new information*, International Economic Review, **10**, 1-21.

Fama, E.F. and French, K.R., 1993, *Common risk factors in the return on stocks and bonds*, Journal of Financial Economics, **33**, 3-56.

Fama, E.F. and French, K.R., 1996, *Multifactor Explanations of Asset Pricing Anomalies*, Journal of Finance, **51**, 55-84.

Fama, E.F., 1998, *Market efficiency, long-term returns, and behavioral finance*, Journal of Financial Economics, **49**, 283-306.

Fama, E.F. and Kenneth R.F., 2008, *Dissecting anomalies*, Journal of Finance, **63**, 1653-1678.

Fauzi, F., Wellalage, N.H. and Locke, S., 2012, *The Global Financial Crisis' Impact on Short-term Performance of IPO: The Case Study of New Zealand Firms' IPOs*, Asian Journal of Finance and Accounting, **4**, 180-198.

Fortune, P., 2000, Margin requirements, margin loans, and margin rates: practice and principles. New England Economic Review, September/October, 19-44.

Francis, B.B., Hasan, I, Lothian, J.R. and Sun X., 2010, *The Signaling Hypothesis Revisited: Evidence from Foreign IPOs*, Journal of Financial and Quantitative analysis, **45**, 81-106.

Franks, J., Harris, R. and Titman, S., 1991, *The post-merger share-price performance of acquiring firms*, Journal of Financial Economics, **29**, 81-96.

Gannon, G. and Zhou, Y., 2008, *Conflicts of interest and China's A-share underpricing*, International Review of Financial Analysis, **17**, 491-506.

Gao, Y., 2010, *What comprises IPO initial returns: Evidence from the Chinese market*, Pacific-Basin Finance Journal, **18**, 77-89.

Giudici, G. and Roosenboom, P., 2004, *Pricing Initial Public Offerings on Europe's new stock market, The Rise and Fall of Europe's New Stock Markets*, Advances in Financial Economics, **10**, 25 – 59.

Goergen, M., Khurshed, A., Mudambi, R., 2007, *The long-run performance of UK IPOs: Can it be predicted?* Managerial Finance, **33**, 401-419.

Gompers, P.A. and Lerner J., 2003, *The really long-run performance of Initial Public Offerings: The pre-Nasdaq evidence*, Journal of Finance, **58**, 1355-1392.

Gregory, A., Guermat, C. and AI-Shawawrah, F., 2010, *UK IPOs: Long run returns, behavioural timing and Pseudo Timing*, Journal of Business Finance and Accounting, **37**, 612-647.

Grinblatt, M. and Hwang, C., 1989, *Signaling and the pricing of new issue*, Journal of Finance, **44**, 393-420.

Gujarati, D.G., 2003, Basic Econometrics 4th edn. Singapore: McGraw-Hill/Irwin.

Guo, H. and Brooks, R., 2008, *Underpricing of Chinese A-share IPOs and short-run underperformance under the approval system from 2001 to 2005*, International Review of Financial Analysis, **17**, 984-997.

Guo, E., Lev, B. and Zhou, N., 2004, *Competitive Costs of Disclosure by Biotech IPOs*, Journal of Accounting Research, **42**, 319-355.

Hahl, T., Vähämaa, S. and Äijö, J., 2014, *Value versus growth in IPOs: New evidence from Finland*, Research in International Business and Finance, **31**, 17-31.

Handa, R. and Singh, B., 2015, *Women directors and IPO underpricing: evidence from Indian markets*, Gender in Management: An International Journal, **30**, 186-205.

Hamilton B. and Nickerson, J., 2003, *Correcting for endogeneity in strategic management research*, Strategic Organization, **1**, 53-80.

Hanley, K.W. and Hoberg, G., 2010, *The information content of IPO prospectuses*, The Review of Financial studies, **23**, 2821-2863.

Harjoto, M. and Garen, J., 2003, *Why Do IPO Firms Conduct Primary Seasoned Equity Offerings?*, The Financial Review, **38**, 103-125.

Hausman, J.A., Hall, B.H. and Griliches, Z., 1984, *Econometrics models for count data with an application to the patents-R&D relationship*, Econometrica, **52**, 909-938.

Healy, P.M. and Palepu, K.G., 2001, *Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature*, Journal of Accounting and Economics, **31**, 405-440.

Heerden, G. and Alagidede, P., 2012, *Short run underpricing of initial public offerings (IPOs) in Johannesburg Stock Exchange (JSE)*, Review of Development Finance, **2**, 130-138.

Hein, S.E. and Westfall, P., 2004, *Improving tests of abnormal returns by bootstrapping the multivariate regression model with event parameter*, Journal of Financial Econometrics, **2**, 451-471.

Hertzel, M.G. and Li, Z., 2010, *Behavioral and Rational Explanations of Stock Price Performance around SEOs: Evidence from a Decomposition of Market-to-Book Ratios*, Journal of Financial and Quantitative Analysis, **45**, 935-958.

Hong, H., Scheinkman, J. and Xiong, W., 2006, *Asset float and speculative bubbles*, Journal of Finance, **61**, 1073-1117.

Huang, Y.-S., 1999, *The price behaviour of initial public offerings on the Taiwan Stock Exchange*, Applied Financial Economics, **9**, 201-208.

Huang Y.C. and Cheng Y.J., 2013, *Stock manipulation and its effects: pump and dump versus Stabilization*, Review of Quantitative Finance and Accounting, **44**, 791-815.

Huyghebaert, N. and Hulle, C.V., 2006, *Structuring the IPO: empirical evidence on the portions of primary and secondary shares*, Journal of Corporate Finance, **12**, 296-320.

Ibbotson, R.G., 1975, *Price performance of common stock new issues*, Journal of Financial Economics, **2**, 235-272.

Ibbotson, R.G. and Jaffe, J., 1975, *"Hot issue" markets*, Journal of Finance, **30**, 1027–1040.

Ibbotson, R.G., Ritter, J.R., Sindelar, L., 1994, *The market's problem with the pricing of Initial Public Offerings*, Journal of Applied Corporate Finance, **7**, 66-74.

Jakobsen, J.B and Sørensen, O., 2001, *Decomposing and testing long-term returns: An application on Danish IPOs*, European Financial Management, **7**, 393-417.

Jelic, R., Saadouni, B. and Briston, R., 2001, *Performance of Malaysian IPOs: Underwriters reputation and management earnings forecasts*, Pacific-Basin Finance Journal, **9**, 457-486.

Jenkinson, T. and Ljungquist, A., 2001, Going Public: The theory and evidence of how companies raise equity finance (2nd ed.), Oxford: Oxford University Press.

Johnson, N.J., 1978, *Modified t tests and confidence intervals for asymmetric populations*, Journal of the American Statistical Association, **73**, 536-544.

Kao, J.L., Wu, D. and Yang, Z., 2009, *Regulations, earnings management, and post-IPO performance: The Chinese evidence*, Journal of Banking and Finance, **33**, 63-76.

Kennedy, D.B., Sivakumar, R. and Vetzal, K.R., 2006, *The implications of IPO underpricing for the firm and insiders: tests of asymmetric information theories*, Journal of Empirical Finance, **13**, 49-78.

Kenourgios, D.F., Papathanasiou, S. and Melas, E.R., 2007, *Initial performance of Greek IPOs, underwriters' reputation and oversubscription*, Managerial Finance, **33**, 332-343.

Kirkulak B., 2008, *The initial and long-run returns of Japanese venture capital-backed and non-venture capital-backed IPOs*, International Journal of Managerial Finance, **4**, 112-135.

Kirkulak, B. and Davis, C., 2005, *Underwriter reputation and underpricing: Evidence from the Japanese IPO market*. Pacific-Basin Finance Journal, **13**, 451-470.

Klein, D. and Li, M., 2009, *Factors affecting secondary share offerings in the IPO process*, The Quaterly Review of Economics and Finance, **49**, 1194-1212.

Kooli, M. and Meknassi, S., 2007, *The survival profile of U.S. IPO issuers: 1985-2005*, Journal of Wealth Management, **10**, 105-119.

Kooli, M. and Suret, J.M., 2004, *The aftermarket performance of initial public offerings in Canada*, Journal of Multinational Financial Management, **14**, 47-66.

Kumar, A., 2009, *Who Gambles in the Stock Market*?, Journal of Finance, **64**, 1889-1933.

Kunz, R.M. and Aggarwal, R., 1994, *Why initial public offerings are underpriced: Evidence from Switzerland*, Journal of Banking and Finance, **18**, 705-723.

Lang, M.H. and Loudholm, R.J., 2000, *Voluntary disclosure during equity offerings: Reducing information asymmetry or hyping the stock?*, Contemporary Accounting Research, **17**, 623-663.

Lee, P.J., Taylor, S.L. and Walter, T.S., 1996, *Australian IPO pricing in the short and long run*, Journal of Banking and Finance, **20**, 1189-1210.

Leone, A.J., Rock, S. and Willenborg, M., 2007, *Disclosure of intended use of proceeds and underpricing in initial public offerings*, Journal of Accounting Research, **45**, 111-153.

Lin, Z.J. and Tian, Z. (2012), *Accounting conservatism and IPO underpricing: China Evidence*, Journal of International Accounting, Auditing and Taxation, **21**, 127-144.

Lintner, J., 1965, *The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets*, Review of Economics and Statistics, **47**, 13-37.

Ljungqvist, A., 1997, *Pricing initial public offerings: Further evidence from Germany*, European Economic Review, **41**, 1309-1320.

Ljungqvist, A., 2007, Handbooks in Finance: Empirical Corporate Finance Chapter III IPO underpricing 4th edn. USA: Elsevier.

Ljungqvist, A. and Wilhelm, W.J., 2003, *IPO underpricing in the dot-com bubble*, Journal of Finance, **58**, 723-752.

Lonkani, R. and Firth, M., 2005, *The accuracy of IPO earnings forecasts in Thailand and their relationships with stock market valuation*, Accounting and Business Research, **35**, 269-286.

Loughran, T. and Ritter, J.R., 1995, *The new issue puzzle*, Journal of Finance, **50**, 23-51.

Loughran, T. and Ritter, J.R., 2000, *Uniformly least powerful tests of market efficiency*, Journal of Financial Economics, **55**, 361-89.

Loughran, T. and Ritter, J.R., 2002, *Why do issuers not get upset about leaving money on the Table in IPOs?*, Review of Financial Studies, **15**, 413-443.

Lowry, M. and Schwert, G.W., 2002, *IPO Market Cycles: Bubbles or Sequential Learning?* Journal of Finance, **57**, 1171-1200.

Lowry, M and Shu, S., 2002, *Litigation risk and IPO underpricing*, Journal of Financial Economics, **65**, 309-335.

Lyn, E.O. and Zychowicz, E.J., 2003, *The performance of new equity offerings in Hungary and Poland*, Global Finance Journal, **14**, 181-195.

Lyon, J.D., Barber, B.M. and Tsai, C.L., 1999, *Improved methods for tests of long-run abnormal returns*, Journal of Finance, **54**, 165-201.

Marisetty, V.B. and Subrahmanyam, M.G., 2010, *Group affiliation and the performance of IPOs in the Indian stock market*, Journal of Financial Markets, **13**, 196-223.

Mazouz, K., Saadouni, B. and Yin, S., 2008, *The long-term performance of Hong Kong share-only and unit initial public offerings (IPOs)*, Journal of Multinational Financial Management, **18**, 209-228.

Mazouz, K., Saadouni, B. and Yin, S., 2009, *Offering methods and issuer-oriented uderpricing costs: Evidence from the Hong Kong IPO market*, Journal of International Financial Markets, Institutions & Money, **19**, 937-949.

Michaely, R. and Shaw, W.H., 1994, *The Pricing of Initial Public Offerings: Tests of Adverse-Selection and Signaling Theories*, Review of Financial Studies, **7**, 279-319.

Minardi, A., Moita, R. and Castanho, P., 2015, *Investigating the partial adjustment effect of Brazilian IPOs*, Journal of Business Research, **68**, 189-198.

Mitchell, M. and Stafford, E., 2000, *Managerial decisions and long-term stock price performance*, Journal of Business, **73**, 287-329.

Mok, H.M.K. and Hui, Y.V., 1998, *Underpricing and aftermarket performance of IPOs in Shanghai, China*, Pacific-Basin Finance Journal, **6**, 453-474.

Moshirian, F., Ng, D. and Wu, E., 2010, *Model specification and IPO performance: New insights from Asia*, Research in International Business and Finance, **24**, 62-74.

Mossin, J., 1966, *Equilibrium in a Capital Asset Market*, Econometrica, **34**, 768-783.

Muendler, M. A., 2008, *Risk-averse investors do not acquire information*, Finance Research Letter, 5, 156-161.

Nagata, K., 2013, *Does earnings management lead to favorable IPO price formation or further underpricing? Evidence from Japan*, Journal of Multinational Financial Management, **23**, 301-313.

Neilson, C., Rimmel, G. and Yosano, T., 2015, *Outperforming markets: IC and the long-term performanceof Japanese IPOs*, Accounting Forum, **39**, 83-96.

Neter, J., Wasserman, W. and Kutner, M., 1985, Applied Linear Statistical Models, 2nd edn. Richard D. Irwin, Inc., Homewood.

Ng, A., Yuce, A. and Chen, E., 2009, *Determinants of state equity ownership, and its effect on value/ performance: China's privatized firms*, Pacific-Basin Finance Journal, **17**, 413-443.

Opler, T.C. and Titman, S., 1994, *Financial distress and corporate performance*, Journal of Finance, **49**, 1015-1040.

Orlov, A.G., 2006, Capital controls and stock market volatility in frequency domain, *Economics Letters*, **91**, 222-228.

Pagano, M., Panetta, F. and Zingales, L., 1998, *Why do companies go public? An empirical analysis*, Journal of Finance, **53**, 27-64.

Pastor-Llorca, M.J. and Poveda-Fuentes, F.P., 2006, Initial Public Offerings: An International Perspective Part One Performance of IPOs: Earnings management and the long-run performance of Spanish Initial Public Offerings, 1st edn. USA: Elsevier.

Paudyal, K., Saadouni, B. and Briston, R.J., 1998, *Privatisation initial public offerings in Malaysia: Initial premium and long-term performance*, Pacific-Basin Finance Journal, **6**, 427-451.

Pour, E.K. and Lasfer, M., 2013, *Why do companies delist voluntarily from the stock market?*, Journal of Banking & Finance, **37**, 4850-4860.

Richardson, A.J., and Welker, M., 2001, *Social disclosure, financial disclosure and the cost of equity capital*, Accounting, Organizations and Society, **26**, 597–616.

Ritter, J.R., 1984, *The "Hot Issue" Market of 1980*, Journal of Business, **57**, 215-240.

Ritter, J.R., 1991, *The long-run performance of Initial Public Offerings*, Journal of Finance, **46**, 3-27.

Ritter, J.R., 1998, *Initial Public Offerings*, Contemporary Finance Digest, **2**, 5-30.

Ritter, J.R. and Welch, I., 2002, *A review of IPO activity, pricing, and allocations*, Journal of Finance, **57**, 1795-1828.

Rock, K., 1986, *Why new issues are underpriced?*, Journal of Financial Economics, **15**, 187-212.

Schrand, C. and Verrecchia, R., 2002, *Disclosure choice and the cost of capital: evidence from underpricing in Initial Public Offerings*, Wharton School, University of Pennsylvania working paper.

Schultz, P., 2003, *Pseudo market timing and the long-run underperformance of IPOs*, Journal of Finance, **58**, 483-517.

Scott, D.L., 2005, David Scott's Guide to Investing in Common Stock, Boston: Houghton Mifflin.

Sharpe, W.F., 1964, *Capital Asset Prices: A theory of market equilibrium under conditions of risk*, Journal of Finance, **19**, 425-442.

Sindell, K., 2005, Investing Online for Dummies, (5th edn). Canada: Wiley Publishing Inc.

Silva, A. and Bilinski, P., 2015, *Intended uses of proceeds, underwriter quality and the long-run performance of SEOs in the UK*, Journal of Business Finance and Accounting, Accepted manuscript online: 18 NOV 2015/ DOI: 10.1111/jbfa.12171.

Singh, I. and Van der Zahn, J.-L.W., 2007, *Does intellectual capital disclosure reduce an IPO's cost of capital?: The case of underpricing*, Journal of Intellectual Capital, **8**, 494-516.

Su, D., 2004, *Leverage, insider ownership, and the underpricing of IPOs in China*, International Financial Markets, Institution & Money, **14**, 37-54.

Su, C. and Bangassa, K., 2011, *The impact of underwriter reputation on initial returns and long-run performance of Chinese IPOs*, Journal of International Financial Markets, Institutions and Money, **21**, 760-791.

Su, D. and Fleisher, B.M., 1999, *An empirical investigation of underpricing in Chinese IPOs*, Pacific-Basin Finance Journal, **7**, 173-202.

Sullivan, M.J. and Unite, A.A., 1999, *The Under-pricing of Initial Public Offerings in the Philippines from 1987 to 1997*, Reviews of Pacific Basin Financial Markets and Policies, **2**, 285-300.

Suzuki, K. and Yamada, K., 2012, *Do the Use of Proceeds Disclosure and Bank Characteristics Affect Bank Underwriters' Certification Roles?*, Journal of Business Finance and Accounting, **39**, 1102-1130.

Takahashi, H. and Yamada, K., 2015, *IPOs, growth, and the impact of relaxing listing requirements*, Journal of Banking and Finance, **59**, 505–519.

Teoh, S.H., Welch, I. and Wong, T.J., 1998, *Earning Management and the Long-Run Market Performance of Initial Public Offerings*, Journal of Finance, **53**, 1935-1974.

Thomadakis, S., Nounis, C. and Gounopoulos, D., 2012, *Long-term performance of Greek IPOs*, European Financial Management Journal, **18**, 117-141.

Tinic, S.M., 1988, *Anatomy of Initial Public Offerings of Common Stock*, Journal of Finance, **43**, 789-822.

Uddin, M.H., 2008, *An Empirical Examination of Intended and Unintended IPO Underpricing in Singapore and Malaysia*, International Research Journal of Finance and Economics, **20**, 1450-2887.

Unlu, E., Ferris, S.P. and Noronha, G., 2004, *IPO Underpricing over time: evidence from the UK*, Applied Economics Letters, **11**, 5-9.

Verrecchia, R.E., 2001, *Essays on disclosure*, Journal of Accounting and Economics, **32**, 97-180.

Wang, L., 2014, *Who moves East Asian stock markets? The role of the 2007-2009 global financial crisis*. Journal of International Financial Markets, Institutions and Money, **28**, 182-203.

Wang, Y.F., Lee, P., Chin, C.L. and Kleinman, G., 2005, *The impact of financial forecasts regulation on IPO anomalies: Evidence from Taiwan*, Journal of Financial Regulation and Compliance, **13**, 146-166.

Welch, I., 1989, *Seasoned Offerings, Imitation Costs, and the Underpricing of Initial Public Offerings*, Journal of Finance, **44**, 421-449.

Wen, Y.F. and Cao, M.H., 2013, *Short-run and the long-run performance of IPOs: Evidence from Taiwan stock market*, Journal of Finance and Accounting, **1**, 32-40.

Wu, C. and Kwok C.C.Y., 2007, *Long-run performance of global versus domestic initial public offerings*, Journal of Banking and Finance, **31**, 609-627.

Yu, T. and Tse, Y.K., 2006, *An Empirical Examination of IPO Underpricing in the Chinese A-share Market*, China Economic Review, **17**, 363-382.

White, H., 1980, *A heteroscedasticity-consistent covariance matrix estimator and a direct test for heteroscedasticity*, Econometrica, **48**, 817-838.

Wyatt, A., 2014, *Is there useful information in the 'use of proceeds' disclosures in IPO prospectuses?* Accounting and Finance, **54**, 625-667.